

Good or Great

Colonel, It Is Up to You!

Maj Gen Robert C. Kane, USAF

with Prof. Gene C. Kamena and COL James Lackey, USA

Developing Flexible Command and Control of Airpower

Lt Col Jeffrey Hukill, USAF, Retired

Dr. Daniel R. Mortensen

Strategy and Airpower

Col John A. Warden III, USAF, Retired

Forty-Five Years of Frustration

America's Enduring Dilemma of Fighting Insurgents with Airpower

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Defending the Joint Force

Lessons Learned from Joint Base Balad

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The principle of centralized control and decentralized execution guides the application of airpower across the spectrum of conflict. Yet, the authors contend that "the Air Force has misapplied this primary tenet" by limiting command and control (C2) of airpower only to the combatant commander level. The current centralized practice works well for theater-level military operations but limits the Air Force's ability to respond to situations requiring decision-making authority at lower organizational levels. This article details necessary changes to create a more flexible C2 structure by placing command authority at the appropriate level and providing greater flexibility in complex operating environments.

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Asserting the full capabilities of airpower in achieving national objectives, the author reminds readers that airpower resources are most effective when used in parallel to attack "virtually all of the centers of gravity directly related to strategic objectives, regardless of their location." In defending the unique capabilities of airpower, the author contends that airpower, correctly understood and applied, provides leaders greater flexibility to consider every conceivable method for affecting a center of gravity, regardless of weapons system or class of munitions.

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Good or Great

Colonel, It Is Up to You!

Maj Gen Robert C. Kane, USAF
with
Prof. Gene C. Kamena*
COL James Lackey, USA



Over the past 10 years, I have directly supervised more than 90 colonels in a diverse array of staff, command, and combat environments. It has become obvious to me that the vast majority of them fall into two distinct categories: good colonels and great colonels. The year that I recently spent as commander of the 321st Air Expeditionary Wing in Iraq served to reaffirm that certain tangible attributes do indeed separate the great colonels from the merely good ones. In my new duties as commandant of the Air War College, my goal is to help officers understand these attributes and, more importantly, inspire them to become truly great colonels.

The difference between a good or great colonel can be as discreet as the simple courtesy of a kind word of thanks or as obvious as a display of personal and professional courage and leadership necessary to ensure a tough mission's success. What is a great colonel, and how does an officer be-

come one? This article begins to answer those questions, considers some of the attributes of great colonels, and provides a framework for colonels to think about colonelship—the art of being a great colonel. No “great colonel” school exists in the professional military education system. Colonels become great by understanding what it means to be a colonel, mentoring, observing other great colonels, reflecting on personal experience, working hard, and practicing colonelship.

Regardless of their duty position, level of command, or seniority, all colonels are expected to make things happen, arrive at decisions, and solve problems. The difference between a good colonel and a great one lies in how he or she carries out those tasks. The “how” entails building relationships with senior leaders and fulfilling the mission. This difference involves more than nuance and is difficult to describe, yet anyone who sees great colonels in action recognizes them as such. Typically, we react to

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their effectiveness and efficiency by saying or thinking, “Obviously that colonel gets it!” Great colonels have the same effect as great teams whose whole far exceeds the sum of their parts and whose accomplishments can vastly surpass expectations. Their presence makes their organizations and people more effective and efficient. They engender a synergy and harmony that transcend the leadership structure depicted by organizational charts or layers of bureaucracy.

Great colonels need not have seniority; rather, greatness is a matter of their perspective, judgment, and a personal awareness that they are empowered for a reason—to make a difference. Regardless of whether they command or lead a staff group, great colonels fill gaps, translate, develop and endorse people, build bridges, and close deals. We would do well to take a close look at how they execute those tasks. Unfortunately, few senior leaders take time to explain to new colonels the requirements for making the move from good to great.

Great Colonels Fill Gaps

Great colonels are often the first to see gaps—that is, a lack of capability in people, processes, or resources. A great colonel works behind the scenes to reinforce, train, or educate until the gap disappears. Filling gaps works in all directions—up, down, and laterally—in other words, with superiors, subordinates, and peers.

Colonels have the latitude to define many of their own duties; therefore, they must survey the environment and discern where their efforts, experience, and talents are needed. In simple terms, most great colonels effectively explore the boundaries of their authority. The specific duty position of a colonel serves only as the starting point. Unlike a lieutenant colonel, a colonel does not operate within rigid boundaries; he or she has room to place effort selectively or engage inside and outside the parent organization.

The discretion afforded colonels to decide when and where to place effort depends upon their credibility, responsiveness, and relationship with their immediate bosses, other superiors, and peers. Once they sense and acknowledge a colonel's professional authority, most senior leaders welcome and encourage great colonels to push their limits. Building a reputation for taking on tough tasks and “closing deals” in a manner that does not infringe on others is a vital element in the development of a great colonel. Colonels must be selective in their efforts; they understand when to interject themselves into areas and when to let others work the problem or task. This understanding or sense of when to act comes from being in tune with their environment, knowing what is happening around them, and then taking action, when required, based on critical thinking, experience, and judgment.

Filling gaps is more art than science, so great colonels need a thorough understanding of people and processes. Professional relationships and credible, responsive decisions and actions represent the foundation upon which great colonels use collegial, interpersonal skills to garner the trust and confidence necessary to fill gaps. Great colonels must develop a sense of when and where to get involved; great colonels never say, “Not my job!”

Great Colonels Translate

Of all the skills that colonels possess, the ability to translate—to apply the right perspective—may be the most important. A good colonel becomes a great one by understanding what the boss wants and by comprehending what his words, actions, and emotions really mean. Great colonels add clarity and meaning to random thoughts and senior leaders' “out-loud thinking.” They know when to act and when to let ideas develop. Sometimes colonels must ask for clarification, but after they understand the boss's intent, it is up to them to

translate thoughts into action by providing direction, talking to others, establishing priorities, or reinforcing the commander's intentions through word and deed.

Several translation techniques also guarantee that superiors remain grounded in reality: holding formal and informal conversations and discussion, arranging the boss's schedule to facilitate an accurate picture of the situation, and sometimes closing the door and telling the boss the other side of the story. The latter is not always easy to do, but it is necessary and expected of colonels. Similarly, great colonels encourage subordinates to "close the door" and tell *them* the other side of the story. Great colonels can handle this candor, which encourages their organizations to prosper and grow.

The organization and mission suffer if colonels fail to translate the vision and intent of superiors into action. Failure results in frustration, inaction, wasted efforts, and even low morale. Great colonels have a sense of when to translate and when to seek more information. They are masters at perceiving, both horizontally and vertically, the second- and third-order effects, risks, and considerations necessary to fully understand a course of action or decision. They facilitate decision making with superiors and have the courage to arrive at tough decisions themselves. A great colonel translates and connects to superiors, subordinates, and peers—typically by working behind the scenes and without fanfare. At the end of the day, great colonels obtain buy-in and understanding.

Great Colonels Develop and Endorse People

Great colonels are mentors who use formal and informal means to develop people. They realize that mentoring is the only way to leave behind a true legacy. Mentoring is more than a duty—training the next generation is an obligation. All true development includes organizing a sound mentoring program, investing in people on- and off-duty,

underwriting mistakes, and absorbing the cost in time and money to send people to professional development schools. Great colonels think in terms of the immediate and long-term benefits of investing in people; they visualize future rewards for today's efforts.

Colonels assess the strengths and weaknesses in people and organizations and then do something to address them. They work both formally and informally to develop people, including subordinates, superiors, and peers. Doing so requires a careful consideration of workload so that no one person or organization becomes overtaxed. Great colonels inspire others to pursue excellence, fostering a climate of team building with the goal of increasing the overall effectiveness of the organization's output.

Great colonels not only develop subordinates but also endorse them to superiors. Colonels help make subordinates successful by ensuring that they receive the lion's share of credit for accomplishments while the colonels underwrite mistakes. This balancing act / skill demands finesse and thoughtfulness since the colonel delegates authority but always assumes ultimate responsibility for success or failure. By the time an officer is promoted to colonel, he or she must suppress the desire to receive accolades, deferring to the good of the organization.

Great colonels make organizations great by developing, endorsing, and empowering people. This process takes time and energy, but, if done well, it exponentially improves morale, efficiency, and productivity. In the long term, it creates a legacy that outlasts any single officer—even a great colonel.

Great Colonels Build Bridges

Great colonels consistently strive to build networks up and down the chain of command as well as inside and outside their organizations in order to bring people together and create a more synergistic effort. They combine new ideas, talents, and resources to make the organization better and



more productive—they perform graduate-level team building. Great colonels bring people together to create a team more capable than its separate parts.

Relationships built upon trust and confidence empower colonels and allow them to get things done. Good colonels work hard to build relationships; great colonels understand that relationships are a two-way street requiring give and take. This perspective is critical to success; a self-serving or unit-centric colonel will find others reluctant to cooperate. In the end, garnering buy-in depends on the ability to leverage relationships for the good of the whole team.

Great Colonels Close Deals

Much like the great baseball “closer” who shoulders the pressure in the ninth inning to preserve a win for his team, the great colonel steps up and seals the deal for his organization. Great colonels are closers who possess well-developed skills of persuasion, which, unlike pressure, is based on a logical and intellectually honest argument. The great colonel understands that sound argument is devoid of emotion. An argument may be passionate but rarely zealous. Good persuasion yields consensus, the seminal element of collegiality and cooperation. For example, great colonels will completely and

professionally staff a plan or proposed course of action within their organization and coordinate it with relevant higher, adjacent, and lower echelons. They will then gain buy-in through relationships and build consensus before making a final decision. They do much of this informally through relationships built upon their personal reputations and credibility as honest brokers. Conceivably, a colonel might close the deal using brute force; however, over the long haul, building far-reaching, working relationships and maintaining a reputation as a fair professional contribute significantly to making a great colonel.

Conclusion

As I mentioned at the beginning of this article, there are good colonels and great colonels. The great ones operate with finesse and make things happen—not by what they do but how they do it. Great colonels make organizations great by filling gaps, translating, developing and endorsing people, building bridges, and closing deals inside and outside their organizations. Without great colonels, no organization can succeed in today's environment. Sometimes being good is not good enough. Good or great: colonel, it is up to you! ✪



Maj Gen Robert C. Kane, USAF

General Kane (BS, Grove City College; MS, University of Southern California) is commander of the Spaatz Center for Officer Education and commandant of the Air War College, Maxwell AFB, Alabama. The Spaatz Center directs, integrates, synchronizes, and supports a continuum of officer professional education, research, and outreach that produces leaders for joint and multinational environments. The general has served in Turkey, Korea, Germany, and Iraq in a wide variety of operational and staff assignments, including commands at the squadron, group, wing, and center levels. As commander of the 86th Airlift Wing and Kaiserslautern Military Community, he was instrumental in leading the Ramstein community to win the 2006 Commander in Chief Annual Award for Installation Excellence. Prior to his current assignment, he served as commanding general, Coalition Air Force Transition Team, Baghdad, Iraq, responsible for coalition efforts to rebuild the Iraqi air force. He is a command pilot with more than 4,200 hours in the C-130, C-21, KC-135, C-37, C-32, VC-137, C-12, C-141, T-37, and T-38. General Kane is a graduate of Squadron Officer School, Air Command and Staff College, and Air War College.



Farewell, Lt Col Paul Berg

Gen John A. Shaud, USAF, Retired
Director, Air Force Research Institute

This issue marks the end of a significant era for *Air and Space Power Journal (ASPJ)*. Since 2004 Lt Col Paul Berg, PhD, has served not only as senior editor of *ASPJ* but also as chief of professional journals and mentor to five additional editorial teams that publish independent versions of the *Journal* in Spanish, Portuguese, French, Arabic, and Chinese. He will soon retire from active duty after 28 years of extraordinary service to the nation.

Over the past six years—roughly one-tenth of *ASPJ*'s existence—Lieutenant Colonel Berg supplied the vision and expertise that shaped the *Journal* and furthered its reputation. He enlarged an already enviable network of air, space, and cyberspace experts who offered both thought-provoking commentary on and unflinching peer review of articles submitted to *ASPJ*. Under his leadership, the *Journal* served as a hub of information where airpower laureates and operational leaders met to scrutinize airpower axioms and forge new understanding of evolving capabilities and challenges. As a result, *ASPJ* consistently provided senior military and civilian leaders the benefit of independent, critical thinking across the full spectrum of Air Force disciplines.

Paul's leadership enabled substantial growth in the *Journal*'s quality and timeliness, extending its relevance and accessibility across a new range of multinational readers. He established three new foreign language versions of the *Journal*—French (now Africa and Francophonie), Arabic, and Chinese. Like *ASPJ*'s earlier Spanish and Portuguese editions, these newer journals feature unique content tailored to promote engagement and mutual understanding in strategically important regions. Under Lieutenant Colonel Berg's leadership, the airpower message is now accessible in locales from Beijing to Bogotá, Rio to Riyadh, and Mombasa to Montreal.

Having accumulated some 5,800 flight hours, two tours on the faculty at Air University, and a "365" to the current war, Lt Col Paul Berg is the scholar-warrior we hear about. He has put his heart and soul into both the Air Force and *ASPJ*, and we are privileged to have served with him. On behalf of the men and women of Air University, especially those affiliated with the Air Force Research Institute and all versions of the *Journal*, we congratulate him on his inspiring service to the nation and extend our best wishes for success in his future endeavors. ✪



We encourage you to e-mail your comments to us at aspj@maxwell.af.mil. We reserve the right to edit your remarks.

A SEAT AT THE TABLE

Lt Gen Mike Hostage's article "A Seat at the Table: Beyond the Air Component Coordination Element" (Winter 2010) is a refreshing and timely reminder from a highly respected, war-fighting Airman that leadership in war is ultimately a human endeavor, and that physical presence and personal relationships mean much in councils of war. That said, I very much appreciate his wise indication that centralized control of a high-demand, low-density capability such as airpower has real merit, especially in terms of exploiting airpower's inherent flexibility and range in service of economy of force.

My only concern with General Hostage's superb article is the statement that his intent "is to make the ground commander successful" (p. 20). I am uneasy with this remark because some readers might misinterpret it as precluding, *ab initio*, even the possibility that something other than a ground-centric approach would achieve the nation's strategic objectives in Afghanistan or, for that matter, any conflict. I believe that his comment is better interpreted as not diminishing focus on the intent to accomplish the mission (as opposed to simply enabling a particular component commander—ground or otherwise—to claim success). Put another way, fulfilling the mission is (or ought to be) a joint endeavor rather than one that focuses on a single military-service component. More broadly, for all the "joint" rhetoric, true jointness is at the lowest ebb I've seen in years. The Air Force's enormous (yet rarely reciprocated) effort to be deferent to its sister services has earned it little and, in important ways, has been counterproductive. In particular, I worry that Airmen increasingly think of themselves only as adjuncts to, and service providers for, ground commanders. This is not good for the nation. We should not forget that it was multiservice airpower, with

the irreplaceable assistance of ground forces, that unhinged the Taliban in a matter of weeks in 2001. Unfortunately, thereafter a series of various ground-centric strategies that lacked sufficient jointness squandered that early success.

Perhaps it is time for a more air-minded (not "air-centric") approach. To clarify, at its core, "air-mindedness" is not about the Air Force or even airpower *per se*; rather, it is an intellectual approach that emphasizes the strategic goal, and—in its most basic interpretation—looks for opportunities to achieve it in ways that minimize the ability of the enemy to bring his weapons to bear. In this sense, it unapologetically contravenes the ground component's penchant for the often bloody and costly "close fight." To paraphrase Gen George Patton, it is about making the other guy die for his ideology—and if that occurs from the safety of afar, so much the better. Air-mindedness is about imposing upon the enemy the proverbial "unfair fight," and this often (but not always) means exploiting technological prowess that the enemy either doesn't possess or fails to grasp fully. Among other things, it embraces persuading the enemy that he faces a remorseless, impersonal machine that will relentlessly hunt and kill him without compunction. It aims to breed primordial terror. Properly employed, air-mindedness is a psychological endeavor that inflicts not only fear but also a sense of frustration, helplessness, and—ultimately—hopelessness on the adversary's mind-set. It either breaks his will or breaks his body; it ruthlessly forces the enemy to choose his fate.

Airmen, authentically thinking like Airmen, necessarily bring a different perspective to war fighting than do their brothers and sisters of the ground components. I suspect that ground commanders actually want that—as do others. It's worth remembering Undersecretary of Defense Michèle Flournoy's admonition: "During the 80s and early 90s, the

Air Force was on the leading edge in innovative strategic thinking within [the Department of Defense], driving the development of new concepts of operations and ways of war. The Air Force was the poster child for thought-leadership in the Pentagon. But that has become less and less true, even though we need such thinking more today than ever" ("Remarks to the US Air Force Senior Leader Orientation Course" [speech, Air University, 14 August 2009], <http://www.au.af.mil/au/aunews/archive/2009/0419/Articles/USDPRemarks.htm>). I found General Hostage's article a vitally important step towards helping Airmen recapture the intellectual initiative. Let's not allow it to be interpreted in a way I don't believe was intended.

Maj Gen Charles J. Dunlap Jr., USAF, Retired
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THE MUTABLE NATURE OF WAR

As a graduate of the School of Advanced Air and Space Studies, I eagerly read Col Phillip Meilinger's latest article "The Mutable Nature of War" (Winter 2010). However, in this piece, he erects and fells straw men that fail to support his thesis of mutable war. He asserts that "the role and *duty* of military planners from all services should involve doing everything in their power to plan operations that limit the exposure of American forces to danger" (emphasis in original, p. 28). Unfortunately, this puts the cart before the horse. The role and duty of military planners from all services should involve doing everything in their power to plan operations that efficiently accomplish the *mission*. Later, he compounds the error vis-à-vis grand strategy: "In facing any crisis, our leaders should take as their *entering premise* the goal of attaining such [bloodless] results" (emphasis in original, p. 28). Nonsense. This mirrors an enduring airpower fallacy which holds that airpower adds dignity to what would otherwise be an ugly brawl. I am an airpower enthusiast, but those who fancy that any technology will make war less awful are pursuing a chimera.

In facing any crisis, our leaders should take as their entering premise the goal of attaining the political objective: a better state of peace (obviously, not my original thought). Trying to get there on the cheap will always cost more over the long haul. Therefore, our leaders must soberly estimate (and frequently update) the value of the political objective in light of the probable cost in lives and treasure to the very citizens they purport to serve. In doing so, they will achieve—over the course of numerous battles and campaigns—what the author advocates: "limit[ing] the exposure of American forces to danger."

Col David Gurney, USMC, Retired
Miami, Florida

It strikes me that Colonel Meilinger and many of the people he quotes are confusing method and nature. War and violence are inseparable. More precisely, war is inseparable from the willingness to employ—and, when necessary, absorb—violence, both organized and applied to achieve some end. The fact that some operations do not involve physical combat or that technological advances make it possible to inflict more damage and casualties on an adversary than we absorb is neither new nor changes the nature of war. Colonel Meilinger's own examples highlight this fact.

Blockades and sanctions may not involve sustained combat, but their effectiveness often involves willingness to employ violence to enforce or breach them. Much naval history has been made by clashes between blockade runners and blockading warships—participants would disagree that those actions were not violent and bloody on their own scale. The Berlin airlift—arguably one of history's more effective air campaigns—succeeded because the Allies were willing to risk combat to breach the blockade, whereas the Soviet Union was not willing to do the same to enforce it. The US blockade of Cuba in 1962 succeeded on the same principle. That neither actually came to violence does not change the fact that willingness to employ it—"to put our own



skin on the line," in Gen James Mattis's words—was immutably part of both.

Cyberwar—or, more appropriately, cybercombat—also doesn't negate the violent nature of war. Although hacking into computer infrastructure can certainly cause short-term havoc with communications, transportation, power, and economic information, similar disruption due to natural disaster, accident, and criminal activity indicates that such action is unlikely, by itself, to bend a country to another's will. Just as electronic warfare evolved during the latter part of the twentieth century to negate or enhance combat operations, so were the Russians' network attacks on Georgian information systems designed for the same purpose—to render their opponent more vulnerable to combat action. Chinese writings on the subject follow the same theme.

Last, equating our ability to employ violence without absorbing an equal amount as a change in the nature of war is a bit startling. Minimizing unnecessary casualties or damage is not a new principle in war. Certainly the image of Predator crews launching air strikes from half a world away is less gritty than that of an infantry platoon in a firefight. Physical stress and suffering are often less a factor for an aircrew member than an infantryman, but that does not negate the fact that both are involved in applying—and, at times, receiving—violence. The same dichotomy has applied since the sling allowed one man to kill another at greater than arm's reach. War is the application of, or willingness to apply, organized violence to achieve a specific end. Good leadership in war involves controlling the level and application of violence while minimizing exposure to the same. Both principles have survived the test of time.

Col Jamie Sculerati, USAF
MacDill AFB, Florida

GLOBAL POWER

Lt Col Bruce Cox's article "Global Power Requires a Global, Persistent Air-to-Air Capability" (Winter 2010) identifies the key

limitation in our air-to-air power projection—the vulnerability of bases "within range of the area of interest" (p. 48). Fortunately, we have overcome this problem in recent conflicts, but there is no guarantee that we can do so in the next one. The author's proposed solution—arming B-1s with air-to-air capability—is not viable for the following reasons.

First, modifying a B-1 as the author proposes would create the equivalent of an F-15E with 48 missiles, albeit with far less maneuverability to defend itself. Consider what would happen if we sent this "Super Strike Eagle" up against, say, eight Su-30s in the Taiwan Strait. Unfortunately, the Strike Eagle's radar is not magic, and neither is the advanced medium-range air-to-air missile, or any other. There is no doubt about the outcome of the engagement: the B-1 would either run away or find itself at the bottom of the ocean. If anyone thinks otherwise, he or she can hop in an F-15 (C or E) simulator, set the missile load to infinite, and try it. Oh, and this includes setting a limit of no more than three-G turns. Much more goes into air-to-air combat than the number of missiles carried. The enemy probably will operate from his home airfields, so his problem set will not include range, numbers, and persistence.

Second, we have a very limited number of B-1s left in the inventory—how many should we modify for air-to-air combat? What impact would this have on our intercontinental strike capability? Is that acceptable? The counterargument to my first point would involve creating the large numbers of B-1s that we would need to actually gain and maintain air superiority. Unfortunately, I don't believe we can do that because of our small fleet.

Finally, the aircrew training required to maintain proficiency in the air-to-air role is far more demanding than that for the air-to-ground role (ask any multirole-fighter aircrew). Lieutenant Colonel Cox's solution would create at least a doubling of B-1 crews' training—is that really vi-

able? What happens to their (primary) air-to-ground proficiency? The rest of the article is interesting, and I feel that remotely piloted aircraft will likely assume the air-to-air role in the future. For now, though, improving access to defensible airfields in high-threat areas is a more tenable solution than arming B-1s with air-to-air capabilities.

Lt Col Paul Matier, USAF
Washington, DC

FALL 2010 ISSUE

Once again you have produced a fantastic quarterly issue that contains a terrific variety of articles that are well written and nicely sourced. That issue was an outstanding team effort. I truly appreciate and find very useful the leadership articles by Gen Stephen R. Lorenz, USAF. Well done!

Daniel McDowell
St. Paul, Minnesota

REENABLING AIR FORCE COMMAND AND CONTROL FOR TWENTY-FIRST-CENTURY PARTNERSHIPS

"Reenabling Air Force Command and Control for Twenty-First-Century Partnerships" by Lt Gen Philip Breedlove and Maj Brian Tyler (Fall 2010) is a great article that highlights the requirement for building personal relationships and flexibility in our command and control (C2) structures. My one concern is the authors' statement "With regard to the former [joint trust], relationships between commanders are often more important than command relationships" (p. 13). I fear that some people might misconstrue that statement as minimizing the importance of command relationships or else justifying not taking the time required to think through command relationships and get them correct. I believe it is more correct to say that both command relationships and personal relationships are important because one without the other would make our C2 structures less effective.

Col Edward J. Groeninger, USAF, Retired
Hurlburt Field, Florida

Kudos to Lt Gen Philip Breedlove and Maj Brian Tyler for their well-written article. It is a good discussion of how joint force air component commanders (JFACC) exercise C2, but it didn't fully bring to light the issue of US Air Force C2 at the operational level because it concentrates on how joint air operations centers support JFACCs. That is only half of the story. I wish the authors had also discussed the importance of Air Force forces support to both plan development and the sustainment of mission operations, as well as the importance of reachback to headquarters units to support the mission.

Col Patricia Battles, USAF
Pentagon, Washington, DC

CIVILIAN LANGUAGE EDUCATION IN AMERICA

I fully agree with retired Air Force colonel John Conway's article "Civilian Language Education in America: How the Air Force and Academia Can Thrive Together" (Fall 2010). When it comes to languages, there is indeed a disconnect between ROTC, Officer Training School, and the Air Force Academy on the one hand, and the rest of the Air Force on the other. One of my majors at Virginia Military Institute (one of the five military schools Colonel Conway mentions) was French. I graduated in 1994 when the world differed noticeably from today's post-11 September 2001 environment. I began studying French in the eighth grade and wish I had started even earlier since I'm almost fluent.

In my opinion, the military is appropriately targeting Farsi and Pashtoon capabilities because those languages are the "soupe du jour" for the current war effort. Meanwhile, the military seems to be deemphasizing other languages, as evidenced by its disallowing foreign language proficiency pay for military members who speak the "Big Three" languages unless they are assigned to jobs that specifically require them. However, we still need the Big Three to maintain ties to valuable allies in both Europe



and Asia. Opportunities to hone skills in these languages are available only on our own time and expense while we're away from the office.

Maybe I'm just one of the too many French-speaking officers, but I'll take my commentary a step further. I have found that when I use French with native speakers, the dialogue—thus, the relationship—becomes that much stronger because I made the effort to speak their language rather than assuming that my international counterparts would speak English (i.e., the *quid pro quo* is vastly improved). Additionally, I perceive that the Air Force's developmental team construct, at least in the combat air forces, barely emphasizes language capabilities unless the teams need to fill a particular quota for an intermediate or a senior developmental education school. Based on feedback from people I have mentored during the professional military education process, I think that members who have no capability or interest in foreign languages are often handed opportunities to fill those quotas and that they accept those assignments reluctantly. Individuals clamoring to use language capabilities they acquired prior to joining the Air Force have few opportunities to do so. I think that the Air Force is not looking at the whole skill set of officers and is not leveraging those personnel who already possess language capabilities. I'm a qualified attaché working in the Air Staff while my language skills sit on the shelf because my attaché assignment was cancelled three years ago. I welcome opening up dialogue on this topic.

Lt Col Timothy P. Lyon, USAF
Pentagon, Washington, DC

I read Col John Conway's article with interest. My background includes graduating from the Defense Language Institute's (DLI) Korean language program and then serving as a Korean linguist, signals intelligence officer, and associate dean of three different schools at DLI's Foreign Language Center. I retired in 1998. Although Colonel Conway makes many good points, I believe

that the best way to get Air Force officers who are qualified in less commonly taught languages is to send them to DLI.

The Army has a robust foreign area officer program and sends many officers there for foreign language training. During my active duty career, the Air Force sporadically attempted to start a foreign area officer program, but without much success. I don't know if that situation has since improved. Colleges may institute programs in certain languages, but financial and other constraints may not allow those programs to exist for long. If a military service needs language training for its members, DLI gets the resources to start and sustain programs for as long as needed. In addition, DLI can send out mobile teams to conduct refresher training.

One very good potential source of Air Force officers with language abilities in less commonly taught languages is the existing pool of enlisted cryptologic linguists. I don't think that linguist retention rates after the first term of enlistment are very high. Why not try harder to recruit those qualified enlisted linguists to become officers? As an instructor for a signals intelligence officer course in the 1980s, I trained many prior-service linguists to become signals intelligence officers. This program virtually stopped when higher levels of command became concerned that many of these officers would retire before serving long enough to attain field grade rank and become eligible to fill managerial and command billets.

Although civilian education can certainly be helpful to the military, if a service really wants officers who possess top-notch language skills, it sends them to DLI one way or another; ensures they get jobs that actually make use of these languages; and makes sure they get the time and resources to maintain their language proficiency. Perhaps foreign language qualifications and ability should become a factor in promotions as well.

Maj Michael Markovitch, USAF, Retired
Monterey, California

SEEING THE WHOLE ELEPHANT

Lt Col Michael Pietrucha's article "Seeing the Whole Elephant: Envisioning a Successful Light Attack Program for the US Air Force" (Fall 2010) reminded me of an experience during the Vietnam War. During the early 1970s, while on the Air Staff, I participated in a project called Credible Chase, which involved substituting a simple aircraft for an AC-130 gunship and providing village or regional fire support. Various manufacturers came forward with alternative design proposals. The project eventually involved two small short-takeoff-and-landing cargo airframes with fixed miniguns. The results were mixed, and funding problems eventually caused the program to be cancelled. One additional proposal that was particularly attractive involved an updated F-51 with a turboprop, which might be worth another look today. Good luck with this one.

Lt Col Ray Hodson, USAF, Retired
Austin, Texas

FINISHING STRONG IN IRAQ

Assuming that the US government's commitment to withdraw its troops from Iraq is not overturned by political or military uncertainties, US armed forces will complete their pullout in about one year. As we know, the withdrawal process has already begun. In the eyes of many people, however, the war in Iraq, along with the withdrawal announcement, has left unanswered questions about the war's purpose, whether it was worth all the effort, and who won. After the US military pullout, more questions will arise concerning whether the war is really over and what will happen after the US withdrawal. With all these questions in mind, I read Lt Col William Martin's article "Finishing Strong in Iraq: Why the Air Force Must Be the Last to Leave Operation Iraqi Freedom" (*ASPJ*, Summer 2010; *ASPJ in Chinese*, Fall 2010).

There is no doubt that the US Air Force has played crucial roles in all the wars and military operations since the first Gulf War. Without sustained intelligence, surveillance,

and reconnaissance coverage, preparation of operational environments (such as airborne electronic attack), personnel and material transport, and close air support, US surface forces would be fighting very different wars with very different results. Indeed, Lieutenant Colonel Martin builds his argument mainly on the basis of such primarily US Air Force functions. I agree that withdrawing military forces before the war is won will require a strong air force to serve as a rear guard. Additionally, as the author puts it, the Iraq war is "not the war we might want or wish to have at a later time" (p. 46). Put differently, although the US military can influence the withdrawal timetable, it cannot determine the withdrawal environment. We already saw that the first US withdrawal in August 2010 occurred quietly. An unfriendly environment is the most straightforward and logical reason for the US Air Force to be the last military force to pull out.

If I understand correctly, both Pres. Barack Obama and Secretary of Defense Robert Gates intend to withdraw only combat forces. A large number of other US personnel, including active service members, will stay in Iraq to support stability operations and foreign internal defense. Who then will protect these other US personnel? Further, who will continue to fulfill the yet-to-be-realized US national objectives? These two questions actually relate to the questions I raised at the beginning. The author stops short here and fails to move further in this direction, but we can surmise that these responsibilities will be shouldered primarily by the US Air Force in the next phase of the operation.

It is easy to expect that even if the US Air Force eventually pulls out, it will not stay far away from Iraq. Operations similar to Southern Watch and Northern Watch will continue to occur. Although US Army boots may no longer tread on Iraqi ground, US fighter jets will maintain control of the Iraqi sky. So, in the foreseeable future, I think the US Air Force will not leave Iraq, at least not in the true sense of the word "withdrawal."

Jia Mingzheng
Nanjing, China

In air combat, “the merge” occurs when opposing aircraft meet and pass each other. Then they usually “mix it up.” In a similar spirit, Air and Space Power Journal’s “Merge” articles present contending ideas. Readers are free to join the intellectual battlespace. Please send comments to aspj@maxwell.af.mil.

Accessibility

Improving the Mobilization Framework in Order to Leverage Availability of the Air National Guard

Maj Sean F. Conroy, ANG*

Going to war is not supposed to be easy. Sending citizens, including members of the regular and reserve forces, into harm’s way is not supposed to be routine.¹ The powers to declare war, regulate the armed forces, and call forth the militia all belong to the Congress. At the time of the nation’s founding, placing these powers in a body whose members could barely get along assured that war would not come easily. Although recognizing the need for a ready force, the framers of the Constitution harbored fears of a standing army.² Together with these safeguards, the procedural processes embodied in Air Force instructions (AFI) and business rules impose strict guidelines on when and how the nation may call Air National Guard (ANG) forces to duty. These guidelines determine the accessibility of the ANG—the measure of the ease with which the nation obtains the capabilities that reside in that organization. However, for at least the last nine years, the Air Force—unlike its sister services—has routinely circumvented many of these mandates in order to access the ANG without employing involuntary mobilization. This loophole tactic inflates the perceived combat capability of the active component of the Air Force (RegAF) while incorrectly

calling into question the availability of ANG units and individual guardsmen.

The word *available* indicates that an entity has the qualities and willingness to take on responsibility and that it is accessible for use—a description applicable to the ANG. Thus, the accessibility of ANG personnel to the RegAF and their availability to fulfill RegAF taskings are not the problem. The true measure of accessibility is not the ease with which the RegAF tasks the ANG but how often the ANG fills Air Force needs without denying the request. Accessibility, therefore, involves not only the ability of the RegAF to *task* the ANG but also the affirmative ANG response when the RegAF *asks*. ANG units have neither claimed non-availability nor turned down the opportunity to participate in the current conflicts.

The ANG has never failed to participate when the RegAF gave it the opportunity to do so, but there are better ways to access the ANG than the current combination of voluntary and involuntary mobilization. At present, the RegAF programs ANG voluntary mobilizations into the deployment cycle.³ This situation not only runs contrary to the precepts of AFI 10-402, volume 1, *Mobilization Planning and Personnel Readiness*, 9 August 2007, but also masks the RegAF’s incapacity to meet combatant commander

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(COCOM) requirements while keeping the burdens of mobilization on the ANG unit and the individual Guard member instead of on the RegAF. The Air Force needs to build a predictable and stable rule set prior to formalizing current mobilization business rules into an AFI. Improving this rule set should emphasize normalizing and making transparent the requirements for voluntary and involuntary mobilization. Such improvement will eliminate any questions about the RegAF's ability to access the ANG when needed.

This article does not argue against all voluntary mobilizations, which represent a valuable way for the ANG to support Air Force requirements and afford members who would otherwise not deploy the opportunity to serve. However, the RegAF should not fill gaps in its actual readiness with capability provided through voluntary mobilization. Involuntary mobilization is the proper way to use ANG assets to fill this capability gap. The current conflicts will eventually wind down, but the "concept of an operational reserve, in which Reserve forces participate routinely and regularly in ongoing military missions," will endure.⁴ Therefore we need to account properly for ANG use and ensure that its personnel are accessed equitably and fairly.

Toward that end, this article first recounts the seamless and indispensable integration of the ANG into the RegAF in service to the nation. Next, it describes the voluntary and involuntary mobilizations of the ANG, exploring the federal laws that enable a guardsman to deliver needed capability to the RegAF. The article then examines Department of Defense (DOD) and Air Force policies that affect accessibility of ANG members. It concludes by recommending changes to improve and sustain total force participation based on a credible accounting by the Air Force of the support it receives from the ANG.

Demonstrated Accessibility

The years since the terrorist attacks of 11 September 2001 (9/11) have witnessed unprecedented use of all types of ANG units, enabling

the Air Force to meet its taskings both at home and abroad. However, the history of the ANG, especially the past 20 years, tells a completer story and fully illustrates how the Air Force has drifted away from both congressional requirements for utilization of the ANG and its own policies for such utilization.

The ANG has always delivered critical capability to the United States by filling the gap when mission requirements exceeded the abilities of the RegAF's force structure. Starting in 1953 and continuing after the end of the Cold War, the ANG performed the homeland air defense mission. At one time or another, all of the 70 ANG fighter squadrons in existence during this period participated in this mission. Otherwise, the Air Force could not have carried out homeland air defense while fulfilling its overseas commitments.⁵ The Cold War offers many examples of the ANG's acting as a shock absorber for the Air Force and conducting operational missions such as homeland defense.⁶

ANG integration accelerated following the Cold War. After Saddam Hussein invaded Kuwait in 1990, the United States mobilized for war. Among those deployed were 12,456 members of the ANG.⁷ During the 12 years that followed the Gulf War, almost every F-16 and F-15 unit in the ANG deployed to the Middle East to enforce the no-fly zones in northern and southern Iraq. Much of the airlift and tanker support for these operations came from ANG units as well.⁸ Many units deployed multiple times. Additionally, ANG fighters participated in no-fly-zone enforcement in the Balkans and in Operation Allied Force.

After 9/11 the DOD launched Operation Noble Eagle (ONE), "the name given to military operations related to homeland security."⁹ Ultimately, the ANG assumed most of the air sovereignty alert missions, operating most (16 of 18) of the alert sites as part of ONE ground alert (ONE GA), the 24-hour-a-day, 365-day-a-year homeland security mission. ONE GA fighters and tankers stand ready to launch in order to intercept potentially hostile aircraft and other aircraft of interest, including civilian planes in distress. ANG aircraft continually tasked for

ONE GA further illustrate the Guard's accessibility and availability.

The wars in the Middle East have witnessed a continual ANG presence. It has supplied fighter, airlift, air refueling, search and rescue, special operations, and five different manned and unmanned intelligence, surveillance, and reconnaissance platforms alongside active duty counterparts constantly since 2001.¹⁰ When Operation Iraqi Freedom began in 2003, ANG units participated from day one. The operation's initial surge saw the ANG providing 236 of the Air Force's 863 aircraft (27 percent). Of these aircraft, 92 were fighters (31 percent of the total number of fighters), 72 were C-130s (58 percent of the C-130s and 55 percent of the Air Force's total airlift aircraft), and 57 were KC-135s (38 percent of the deployed KC-135s and 31 percent of the Air Force's air refueling aircraft).¹¹ More than 7,200 air guardsmen deployed for the opening phase of Iraqi Freedom, representing 11 percent of the 64,246-strong Air Force contingent.¹²

In addition to fighters, the ANG currently provides 22 percent of the combat air patrols (nine of 41) flown by remotely piloted aircraft and 24 percent of the intelligence data processing, exploitation, and dissemination ground-based missions (10 of 41) to the joint force.¹³ ANG airlift squadrons, air refueling squadrons, rescue units, air operations groups, medical groups, security forces squadrons, and civil engineering squadrons, among others, have mobilized in support of overseas contingency operations.

Mobilization

The activation authority that brings a guardsman to active duty resides in Title 10 of the *United States Code*. Although Title 10 contains many subsections, this article addresses only those that pertain to war fighting. A guardsman enters the fight in one of two ways: voluntarily or involuntarily.

Voluntary

For reservists who *volunteer*, section 12301(d) of Title 10 applies, under which the service

secretary can accept a volunteer to active duty. A guardsman, however, also requires the consent of state authorities, usually delegated by the governor to the adjutant general. Significantly, governors cannot object to overseas service because of "location, purpose, type, or schedule of such active duty."¹⁴

Thus, the burden of activation remains on the volunteer and his or her chain of command. The volunteer often faces a confused and perturbed employer as well as a largely unengaged community. Legal protections for military service are the same, regardless of whether the member mobilizes voluntarily or involuntarily, but the perceptions are decidedly different. Some civilian employers accept their employees' involuntary mobilizations much more readily than voluntary mobilizations. After all, in a voluntary mobilization, the employee decides whether or not to deploy and, by extension, leave the civilian employer.

Guardsmen are rarely part of a larger military community such as the one on or near an active duty base. Voluntary mobilizations—especially of small numbers of personnel—do not generate the community support that involuntary mobilizations of large units do. Often the voluntary mobilization passes almost unnoticed. For the member's chain of command, a unit-based force like the ANG must accept a reduced mission-readiness level when a volunteer vacates one of the unit's personnel billets. The unit will report such reduced readiness status (normally in the Status of Resources and Training report) if the Air Force subsequently mobilizes it.¹⁵

The RegAF relies heavily on voluntary mobilization of the ANG to fill shortfalls. From February 2000 to June 2010, the Air Guard averaged about 12,198 guardsmen on Title 10 active orders each month. Seventy-four percent of these (about 9,062 per month) voluntarily mobilized.¹⁶ At present, the overwhelming majority of ANG combat air forces (CAF) members conduct air and space expeditionary force (AEF) and ONE taskings under voluntary mobilization rules. When the RegAF asked the ANG for capability, it delivered.

More than nine years into the current conflicts, in contrast to the intent of AFI 10-402, the RegAF continues to rely on voluntary mobilization. This instruction specifically defines voluntary mobilization “as a bridge to quickly expand active force capabilities, while awaiting legal authority to proceed with involuntary activation actions,” recognizing a *selective* use of voluntary mobilization “throughout a contingency and beyond.”¹⁷ As the RegAF currently applies this definition, the use of ANG volunteers allows the Air Force to claim that it meets most CAF taskings without involuntary mobilization. This assertion is somewhat misleading because the RegAF cannot meet its tasking without ANG support.

Involuntary

Contrast the discussion above to an involuntary mobilization that can occur after a declaration of war or a presidential or congressional declaration of national emergency.¹⁸ Such a declaration renders the ANG directly accessible to the RegAF.¹⁹ A governor's consent is no longer necessary. Involuntary mobilization, however, requires the RegAF to declare its shortfalls and fill them with members of the Air Reserve Component. In career fields with exceptionally great needs (such as security forces, tactical air control parties, and pararescue), the RegAF has involuntarily mobilized guardsmen and often uses them outside the AEF construct. With involuntary mobilization, the burdens—including the political ones—of using the ANG shift from the ANG member and unit to the RegAF. Finally, involuntary mobilization ensures that guardsmen are covered by secretary of defense policies regarding deploy-to-dwell time ratios (discussed below)—a critical protection that serves to maintain the support of civilian employers and the continued availability of reservists.²⁰

The RegAF executes involuntary mobilization under three distinct sections of Title 10—namely, full mobilization, partial mobilization, and presidential reserve call-up. *Full mobilization* is the common reference for section 12301(a). During a congressionally declared war or national emergency, a service

secretary can call every member of the reserve component “to active duty for the duration of the war or emergency and for six months thereafter.”²¹ Thus, section 12301(a) also addresses *involuntary* mobilization. Section 12301(c) requires entire-unit mobilization during the involuntary mobilization of “members of units organized and trained to serve as units.”²² The ANG consists of units, not individuals.²³ Therefore, the service could not mobilize an individual without that individual's consent. *Partial mobilization* is the concept embodied in section 12302: during a presidentially declared national emergency, the president may order any unit to active duty for not more than two years.²⁴ Section 12302(c) limits this authority to 1 million members of the reserve at any time. According to *presidential reserve call-up*, the common reference for section 12304, the president may call any unit or any individual member of the selected reserve to active duty, with a limit of 200,000 members for 365 days.²⁵ Members of the ANG are part of the selected reserve.²⁶ DOD policies control the actual use of these authorities.

Policy

The DOD and the Air Force apply these mobilization laws when they access the ANG. The conflicts following 9/11 have showcased the invaluable role of the Guard. However, because some policy assumptions prior to 9/11—such as the concept of a *strategic reserve*—no longer hold true, both the DOD and the Air Force are developing policy that matches the current and projected use of the ANG.

Department of Defense Policy

In January 2007, Secretary of Defense Robert Gates issued a memorandum setting goals for limits on how frequently the services involuntarily mobilize their reserve members, resulting in the publication of Department of Defense Directive 1235.10, *Activation, Mobilization, and Demobilization of the Ready Reserve*, on 26 November 2008.²⁷ Finally, on 4 February 2010, the DOD released Department of

Defense Instruction 1235.12, *Accessing the Reserve Components*, which combines the guidance contained in the previous documents.

This instruction calls for a one-to-five (1:5) deploy-to-dwell ratio for ANG units that the Air Force involuntarily mobilizes.²⁸ This goal ratio recognizes that some Guard units will remobilize sooner than the 1:5 ratio would imply.²⁹ Related to this reserve goal is an active component planning objective of a 1:2 deploy-to-dwell ratio.³⁰

Since the ANG provides much of its service in a voluntary status, the dwell ratio is an important part of any dialogue concerning use of the Guard. Exceptions to the 1:5 dwell ratio require approval by the secretary of defense.³¹ Dwell time, however, includes voluntary service.³² Thus, looming over the guardsman is the possibility that he or she could return from a voluntary mobilization and immediately have to mobilize involuntarily.³³

Air Force Policy

"Catch-22 . . . says you've always got to do what your commanding officer tells you to."

"But Twenty-seventh Air Force says I can go home with forty missions."

"But they don't say you have to go home. And regulations do say you have to obey every order. That's the catch. Even if the colonel were disobeying a Twenty-seventh Air Force order by making you fly more missions, you'd still have to fly them, or you'd be guilty of disobeying an order of his. And then Twenty-seventh Air Force Headquarters would really jump on you."

—Joseph Heller, *Catch-22*

The RegAF programs the ANG into the AEF rotation cycle. Both parties have a clear expectation that the ANG will execute deployed missions when demands exceed the RegAF's capability. In practice, upon foreseeing an AEF shortfall, the Air Force should mobilize the ANG forces that are in that same AEF "bucket," yet instead of involuntarily mobilizing the ANG, the RegAF encourages ANG voluntary mobilization within the assigned

AEF.³⁴ Such use of the ANG not only runs contrary to the Air Force's instructions concerning voluntary mobilization but also shifts the burdens of mobilization outlined above to the individual and the unit.³⁵ Even a unit mobilized within its own AEF bucket suffers in that it does not receive credit for the deploy-to-dwell time because deployments from voluntary mobilizations do not count.

The Air Force has another document—*Air Force Mobilization Business Rules*—whose tenets become applicable "when combatant commander requirements exceed the active component . . . capability and [Air Reserve Component] volunteer pool."³⁶ Additional triggers come into play when the RegAF forces in the "AEF library are at or below a 1:2 deployment-to-dwell ratio" and when operational requirements for forces supporting operations from home station exceed the RegAF's capacity.³⁷ The trigger for a reserve mobilization occurs when RegAF forces are spending fewer than two time periods home for every time period deployed.

To avoid the 1:2 trigger, the Air Force programs the ANG squadrons against anticipated requirements and relies upon voluntary mobilization from the Guard. Additionally, the Air Force promotes the development of rotational plans to increase voluntary participation.³⁸ In this manner, the RegAF has used voluntary mobilization to "reduce [RegAF] tempo and mitigate the need for [involuntary] mobilization."³⁹ The RegAF's current use of ANG voluntary mobilization paves the way for the RegAF to claim it can meet the COCOM's aviation needs without involuntarily mobilizing ANG units. However, meeting those needs through voluntary mobilization places the burdens (perturbed employers and unengaged communities) on the deploying member instead of on the service. Furthermore, the DOD and the RegAF count time served during voluntary mobilizations as part of dwell time. True irony will occur when RegAF members make this claim to the very ANG members whose voluntary service enabled the Air Force to avoid involuntary mobilization. A final irony of the RegAF process, specific to the CAF, involves the accounting used to determine the deploy-

to-dwell ratio. The RegAF credits a fighter squadron deployment if any unit type code (UTC) made up of squadron assets deploys. (Operations Iraqi Freedom and Enduring Freedom typically require 12 aircraft and 24 pilots.) This programming and accounting situation exaggerates the deployments of the squadron. A more accurate accounting would look at the deployment of aircraft as a percentage of the total aircraft. The best accounting method would look at personnel.

In the current situation, the RegAF computes its own deployment time at more than twice the actual rate and uses voluntary mobilization to mitigate the effects of this high claim. This doubling of the true rate occurs because the RegAF credits a squadron with a deployment even though only half of the aircraft actually leave home station. The figure below illustrates both the 1:2 unit deployment claim of the RegAF and the 1:5 actual aircraft deploy-to-dwell ratio. A squadron with a primary aircraft authorization of 24 gets credit for a deployment even though only half of the aircraft actually deploy. As the figure shows, for

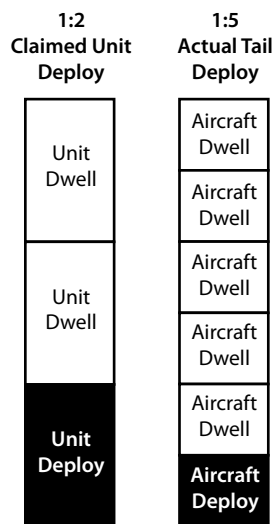


Figure. Current deploy-to-dwell accounting for a RegAF squadron with a primary aircraft authorization of 24 that deploys a 12-ship UTC

any time in which the squadron claims a 1:2 deploy-to-dwell ratio, the aircraft are in a 1:5 deploy-to-dwell ratio.

Under this accounting system, with the trend of RegAF fighter squadrons deploying at the rate of 120 days per 20 months and ANG fighter squadrons deploying for 60 days per 20 months, the RegAF deploy-to-dwell ratio is twice that of the ANG—1:5 for the RegAF versus 1:10 for the ANG. That is true only on its face, however, since most ANG squadrons have just 18 aircraft assigned.

Improving the Accessibility and Availability Framework

Accessibility and availability are irrelevant if the force cannot fight. The Air Force funds the ANG to enable top operational readiness at the same level as the RegAF. In other words, the ANG trains and maintains readiness in accordance with Air Force standards; moreover, it can deploy to a contingency and commence operations within 72 hours. Only units of the *Air Reserve Component* can claim to meet their active counterpart's readiness standards. By funding this high readiness level in the ANG, the Air Force created an operational force upon which it can immediately rely.

The ANG's operational readiness includes an additional benefit of efficiency since it eliminates the need to "train-up" for deployment. Changes to DOD policy that affect the ANG include a one-year limit on involuntary mobilization, with exclusions for predeployment training and postmobilization leave.⁴⁰ Adm Michael Mullen, chairman of the Joint Chiefs of Staff, seeks to maximize the fighting time of activated reserve members in order to gain the most from the one-year limitation.⁴¹ Mobilizing the ANG for one year delivers one full year of combat capability. The Guard, therefore, is available to immediately supply any capability the Air Force needs, yet the system of ANG support to the RegAF does not work optimally.

For over nine years, the Air Force has had the authority to mobilize ANG forces in

support of the COCOM's needs. Nevertheless, the RegAF continues to concentrate on making it easy to task ANG units without procedural safeguards and external oversight. The RegAF's decision to use the ANG must come after an admission that the parent service cannot meet the COCOM's needs. Is the RegAF avoiding some perceived political cost of admitting a readiness shortfall that an involuntary mobilization reveals to the public?⁴² If so, this makes no sense since both the US Navy and US Army have regularly mobilized people involuntarily since 9/11.⁴³

If the RegAF cannot meet COCOM requirements without the ANG, it should so state. The American public deserves both an honest accounting and a say in the use of the ANG. Involuntary mobilizations and any resulting public response constitute a critical check and balance, and the law requires it.

In addition, a number of studies currently under way will demand a true accounting in order to value both the RegAF and the ANG properly. The *Quadrennial Defense Review Report* of 2010 calls for a comprehensive review of the RegAF and reserve component mix.⁴⁴ The RegAF is also developing an internal review—the Total Force Enterprise Analytic Model—that examines the proper mix of RegAF and reserve component forces.⁴⁵

Some practical fixes immediately present themselves. The RegAF should credit deployments in the deploy-to-dwell calculation regardless of whether they are voluntary or involuntary—the method used by the Navy to count deployments of its reserve personnel.⁴⁶ Furthermore, the Air Force should allow individual guardsmen to waive deploy-to-dwell ratios if they want to deploy voluntarily. To do so would prove valuable for the ANG, a force with no individual mobilization augmentees.

The Air Force looks at mobilization rates in squadron—not individual—terms, but the ANG, with its career-long homesteaded force, must always consider the individuals within the squadron as well as the squadron itself.⁴⁷ The RegAF can—and should—con-

tinue to task UTCs. The ANG commander must then manage individuals and ensure the ability to meet the Air Force's needs in the AEF bucket. Those members of the unit who voluntarily mobilize in support of an AEF tasking would gain deploy-to-dwell credit for the mobilization. The onus for accounting and managing the deploy-to-dwell ratio would then rest on the ANG commander—not the RegAF. If the ANG commander fails to manage effectively and overextends his unit by allowing people to deploy individually to diverse locations and missions, he or she will then report a readiness shortfall.

The RegAF needs to review the mobilization rules and either update or comply with them. Staying true to AFI 10-402 mandates that the RegAF use voluntary mobilization only to bridge the gap between a rapidly developing need and authorization for involuntary mobilization. The necessary statutory authorizations are now in place and available for use.

In addition, the current mobilization business rules—specifically, the deploy-to-dwell triggering events—are meaningful only with an accurate accounting of both RegAF and ANG service. Until we have accurate accounting, we should not validate the business rules by formally incorporating them into the AFIs. Presently, accounting gives a squadron credit for deployment when only half of the aircraft actually deploy. Deployment figures must accurately reflect the materiel and people deployed, not simply the squadron flag. As depicted in the figure cited earlier, if only half of the squadron's aircraft deploy for four months every year, the unit deploy-to-dwell is 1:5, not 1:2. Yet the squadron flag remains in dwell, based upon the four-month deployment of half of its assets.

The RegAF cannot continue to program improperly used voluntary mobilizations in order to increase its deploy-to-dwell ratio. Even if the RegAF accurately accounted for its deploy-to-dwell ratio, programming ANG voluntary mobilizations only masks an incapacity to meet COCOM requirements.

Although the ANG has never failed to participate when the RegAF gave it the opportunity to do so, better ways exist for accessing the ANG than the current combination of voluntary and involuntary mobilization. The RegAF needs to build a predictable and stable rule set. Improving this rule set should focus on normalizing and making transparent the requirements

for voluntary and involuntary mobilization. Improvement will ensure that everyone understands the mobilization rules and that the rules do not mask issues that cause inaccurate accounting of service. These suggested changes will benefit the nation and the Air Force by providing a clear picture of the capabilities accessible for service. ✪

Washington, DC

Notes

1. Throughout this article the term *reserve* refers to the combination of the ANG and the Air Force Reserve Command.

2. This is why the Constitution contains the semiannual appropriations clause. If the Army became too powerful, the legislature would remove the funding. Alexander Hamilton, John Jay, and James Madison, *The Federalist*, Gideon ed., ed. George W. Carey and James McClellan (Indianapolis: Liberty Fund, 2001), 208.

3. Deployment consists of the actual departure, arrival, and operation in an overseas location. Mobilization, which entails calling up a reservist and placing him or her on active duty, is a necessary but not sufficient condition of a guardsman's deployment.

4. John D. Winkler, "Developing an Operational Reserve: A Policy and Historical Context and the Way Forward," *Joint Force Quarterly* 59, no. 4 (October 2010): 15, <https://digitalndulibrary.ndu.edu/cgi-bin/showfile.exe?CISOROOT=/ndupress&CISOPTR=42083&CISOMODE=print>.

5. Susan Rosenfeld and Charles J. Gross, *The Air National Guard at 60: A History* (Washington, DC: Air National Guard, 2008), 9.

6. Throughout the Cold War, the Air Force had the capacity to maintain a dedicated home-station alert force in addition to its "wartime" force structure since it had 36 fighter wing equivalents. This option no longer exists because capacity diminished rapidly to 20 fighter wing equivalents after the Cold War. Adam J. Hebert, "Eighty-Six Combat Wings," *Air Force Magazine* 89, no. 12 (December 2006): 26, accessed 22 September 2009, <http://www.airforce-magazine.com/MagazineArchive/Documents/2006/December%202006/1206wings.pdf>.

7. Rosenfeld and Gross, *Air National Guard at 60*, 16.

8. For a look at the broad capabilities supplied to the nation by the ANG during this time period, see *ibid.*, 20–31.

9. Lawrence Kapp, *Operations Noble Eagle, Enduring Freedom, and Iraqi Freedom: Questions and Answers about U.S. Military Personnel, Compensation, and Force Structure*, CRS Report for Congress RL31334 (Washington, DC: Congressional Research Service, 16 February 2005), [CRS-1], <http://www.fas.org/sgp/crs/natsec/RL31334.pdf>.

10. Data from Air National Guard, Operational Plans and Execution Division (NGB/A3X), current as of 31 August 2010.

11. The remaining aircraft included nine E-8s, two MC-130s, one EC-130, and three HH-60s. US Air Force, *Operation Iraqi Freedom—By the Numbers* (Shaw AFB, SC: US Central Command Air Forces, Assessment and Analysis Division, 30 April 2003), 3, http://www.globalsecurity.org/military/library/report/2003/uscentaf_oif_report_30apr2003.pdf.

12. *Ibid.*

13. National Guard Bureau / A2 (intelligence), interview by the author, 16 August 2010.

14. Title 10, *US Code*, sec. 12301(f), http://www.law.cornell.edu/uscode/html/uscode10/usc_sec_10_00012301----000-.html. This section generally refers to mobilization of National Guard units but also applies to the individual volunteer. Interference with the "State Guard's ability to address a local emergency . . . would be a valid basis for a gubernatorial veto." *Perpich v. Department of Defense*, in *United States Supreme Court Reports*, vol. 496 (1990), 334, 352.

15. Air Force Instruction (AFI) 10-401, *Air Force Operations Planning and Execution*, 7 December 2006, 250, par. 9.19, <http://www.e-publishing.af.mil/shared/media/epubs/AFI10-401.pdf>.

16. NGB/A3X.
17. AFI 10-402, vol. 1, *Mobilization Planning and Personnel Readiness*, 9 August 2007, 15, par. 3.2.1, <http://www.e-publishing.af.mil/shared/media/epubs/AFI10-402V1.pdf>.
18. Executive Order 13223, Ordering the Ready Reserve of the Armed Forces to Active Duty and Delegating Certain Authorities to the Secretary of Defense and the Secretary of Transportation, 14 September 2001.
19. Section 12301(b) also applies here. According to this section, a service secretary may order a unit "to active duty for not more than 15 days a year." For the ANG, however, the consent of the governor is still necessary (Title 10, *US Code*, sec. 12301[f]).
20. Department of Defense Instruction (DODI) 1235.12, *Accessing the Reserve Components (RC)*, 4 February 2010, 2, 4.b.(2).
21. Title 10, *US Code*, sec. 12301(a).
22. *Ibid.*, sec. 12301(c). After mobilization, however, the service can separate personnel from the unit.
23. The RegAF, however, includes UTC in the definition of the unit. UTCs sometimes contain a single-person capability. The RegAF cannot involuntary mobilize an individual, but it can mobilize the capability of a single-person UTC.
24. Title 10, *US Code*, sec. 12302(a).
25. *Ibid.*, sec. 12304(a), (c)(2).
26. *Ibid.*, sec. 10143(a); and Title 32, *US Code*, sec. 502(a).
27. Secretary of Defense Robert Gates, memorandum, subject: Utilization of the Total Force, 19 January 2007.
28. Deploy-to-dwell ratio refers to the amount of home-station time granted to a person after deployment. This time, called "dwell," is a function of the time deployed. Thus, a 1:5 deploy-to-dwell ratio means that the member gains five times the deployed time at home station. Thus, one year deployed yields five years dwell.
29. Gates, memorandum; and Department of Defense Directive (DODD) 1235.10, *Activation, Mobilization, and Demobilization of the Ready Reserve*, 26 November 2008, 6, <http://www.dtic.mil/whs/directives/corres/pdf/123510p.pdf>.
30. Gates, memorandum, 1.
31. *Ibid.*; and DODD 1235.10, *Activation, Mobilization, and Demobilization*, 6.
32. DODD 1235.10, *Activation, Mobilization, and Demobilization*, 6.
33. AFI 10-402 allows the Air Force to mobilize an already-serving volunteer as part of the home unit's involuntary mobilization. See AFI 10-402, vol. 1, *Mobilization Planning and Personnel Readiness*, 24, par. 6.3.
34. AFI 10-401 refers to voluntary mobilization as a bridge between the commencement of operations and the legal authorities to mobilize the ANG involuntarily. See AFI 10-401, *Air Force Operations Planning and Execution*, 250, par. 9.19.1.
35. AFI 10-402, vol. 1, *Mobilization Planning and Personnel Readiness*, 15, par. 3.2.1.
36. Message, Air Force Mobilization Business Rules—Change Two (2), DTG: 281928Z OCT 08, pars. 1.A., 2.B.1.
37. *Ibid.*, pars. 2.B.1.1, 2.B.1.2.
38. *Ibid.*, par. 3.A.
39. *Ibid.*
40. DODI 1235.12, *Accessing the Reserve Components (RC)*, 4.b.(1); Gates, memorandum; and DODD 1235.10, *Activation, Mobilization, and Demobilization*, 6.
41. Adm Michael Mullen, chairman of the Joint Chiefs of Staff (address, Reserve Officers Association Annual Mid-Winter Conference, Washington, DC, 2 February 2009), accessed 15 June 2010, <http://www.jcs.mil/speech.aspx?ID=1129>.
42. "When the ARC can't deliver through volunteerism, the RegAF is forced to 'suck it up' for the mission. In terms of tasking the ARC: We are unwilling to mobilize them, and we can't use them again for a long time after they deploy." Comments from RegAF members concerning use of the Air Reserve Component. Air Force Lessons Learned (HQ USAF/A9L), *Total Force Integration Supporting OEF/OIF Fighter/Attack* (Washington, DC: US Air Force, 10 September 2010), 16.
43. US Navy Personnel Command, interview by the author, 2 September 2009.
44. Department of Defense, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, February 2010), 54, <http://www.defense.gov/qdr/qdr%20as%20of%2029jan10%201600.pdf>.
45. Secretary of the Air Force Michael Donley, "Facing Future National and Air Force Challenges" (address, 2010 Senior Enlisted Summit, Maxwell AFB, AL, 4 May 2010), accessed 9 August 2010, <http://www.af.mil/information/speeches/speech.asp?id=550>.
46. US Navy Personnel Command, interview. The US Navy Reserve is primarily an individual mobilization augmentee force, and the ANG is a unit-based force. This difference does not affect the accounting.
47. Unlike a RegAF person who changes duty stations every few years, a guardsman may never leave the unit, making each ANG unit deployment an individual deployment as well. This fact may also predict a higher individual deploy-to-dwell ratio for a guardsman over his or her RegAF counterpart whose 20-year career includes schools, staff work, and other nondeployable assignments. At a 1:5 deploy-to-dwell ratio, the guardsman will spend at least three years of a 20-year career deployed. In the course of the same 20-year career, RegAF members may spend less time deployed.

War Fighting in Cyberspace

Evolving Force Presentation and Command and Control

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The Department of Defense (DOD) is endeavoring to define war fighting in the global cyberspace domain.¹ Creation of US Cyber Command (USCYBERCOM), a subunified functional combatant command (FCC) under US Strategic Command (USSTRATCOM), is a huge step in integrating and coordinating the defense, protection, and operation of DOD networks; however, this step does not mean that USCYBERCOM will perform or manage all cyberspace functions. In fact the vast majority of cyberspace functions conducted by the services and combatant commands (COCOM), although vital for maintaining access to the domain in support of their operations, are not of an *active* war-fighting nature. We apply the concepts of war fighting, offense, and active defense to the domain of cyberspace and propose several recommendations to aid USCYBERCOM as it works with the services and geographic combatant commands (GCC) to fight in cyberspace. That global, regional, and service commanders will have to share command and control (C2) of cyberspace war-fighting capabilities and forces raises several interesting questions about how USCYBERCOM can most effectively work with the GCCs. Specifically, what is the ideal force presentation method, and which C2 model should the DOD use for war-fighting capabilities in

cyberspace? Are there lessons learned from similar global-to-regional support challenges that we might apply to cyberspace C2? We offer US Special Operations Command (USSOCOM) as a model for cyberspace force presentation and C2; however, this model is a long-term goal that is not immediately achievable. In the interim, USCYBERCOM can adapt lessons learned from space and air-mobility force presentation and C2 to develop a building-block approach to evolve cyber force presentation and C2 from its current nascent state to a more mature USSOCOM-like state.

Although other models exist, we examine how space, air mobility, and special operations force presentation and C2 models can inform the way USCYBERCOM could interact with the other COCOMs—particularly the GCCs. We also discuss the complex interdependencies, specialized capabilities, and doctrinal approaches FCCs use as they provide capabilities to GCCs. To begin, we briefly address the inadequacy of current doctrine for war fighting in cyberspace. Then we examine how space and air mobility doctrine can serve as useful, although only partly adequate, models for presenting forces and performing C2. Finally, we provide a building-block methodology to take us from current capabilities to a fully developed USSOCOM-like cyberspace model.

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Why the Existing Information Operations Model Is Insufficient

Current Air Force and joint doctrine governing war fighting in cyberspace is scarce. According to Air Force Doctrine Document (AFDD) 3-12, *Cyberspace Operations*, “Although cyberspace operations are integral to all combatant commands, Services, and agency boundaries, as of the date of publication of this AFDD, there is no overarching joint doctrine for planning or operations in cyberspace.”² A new joint doctrine cyberspace publication is being formally staffed, but published joint doctrine comes no closer to addressing war fighting in cyberspace than a discussion of computer network operations as a subset of information operations (IO).³ Computer network operations and IO are clearly related, but their purposes differ. Gen Keith B. Alexander, commander of USCYBERCOM, wrote, “Although it is understood that land, maritime, air, and space warfare will be employed to deter (for example, influence) an adversary, no one believes that warfare within these domains is uniquely ‘information operations.’”⁴

Both AFDD 3-12 and General Alexander recognize that war fighting in cyberspace is more than a subset of IO; however, at this time Joint Publication (JP) 3-13, *Information Operations*, provides the only joint framework that addresses C2 for cyberspace war fighting. Joint doctrine contains no guidance for cyber force presentation. IO doctrine defines computer network operations, comprised of computer network attack (CNA), computer network defense (CND), and computer network exploitation.⁵ For the purpose of this article, we define cyber war-fighting actions as CNA plus a subset of CND called CND-response actions (CND-RA).⁶ According to JP 3-13, CNA activities are now integrated at the theater level in the J-39 IO cell.⁷ JP 6-0, *Joint Communications System*, notes that CND is integrated within the J-6.⁸ This arrangement is problematic because it splits related war-fighting functions between different staff elements and

essentially minimizes the importance of a war-fighting domain by burying it within the Joint Staff.

Joint doctrine must separate the shared responsibility for maintaining access to the cyberspace domain, which should be a J-6 (communications) function, from the concept of war fighting in cyberspace, which should be a J-3 (operations) function.⁹ General Alexander noted, “Where the principal effect of IO is to influence an adversary *not* to take an action, the principal effect of cyber warfare is to deny the enemy freedom of action in cyberspace” (emphasis in original).¹⁰ To engage in cyber warfare as General Alexander envisions it, responsibility for CNA and CND-RA must expand beyond the Joint Staff and be treated the same as warfare in other domains.

Defining Force Presentation

Force presentation for cyber war fighting is the manner in which USCYBERCOM and the services make CNA and CND-RA capabilities available to the GCCs. JP 1, *Doctrine for the Armed Forces of the United States*, summarizes the roles and responsibilities of the services and COCOMS:

The Services and United States Special Operations Command (in areas unique to special operations) have responsibilities to organize, train, equip, and sustain forces. . . .

The Commanders, US Central Command, US European Command, US Pacific Command, US Southern Command, and US Northern Command. . . . (1) deter attacks against the United States, its territories, possessions and bases, and employ appropriate force should deterrence fail; (2) carry out assigned missions and tasks and plan for and execute military operations, as directed, in support of strategic guidance.¹¹

As the DOD components tasked to fight wars, COCOMs define requirements, and the services then organize, train, equip, and sustain forces to meet them. Currently USSOCOM is unique in that it is a COCOM with service-like responsibilities.

The force presentation and C2 models for space, air mobility, and special operations form steps along a continuum of options that USCYBERCOM can use when providing war-fighting forces and capabilities to the GCCs. The first step, space force presentation, is based on an independent action model that USSTRATCOM uses to control space force presentation and support the GCCs. The second step, air mobility force presentation, is based on an interdependent action model by which US Transportation Command (USTRANSCOM) works with the GCCs to move forces and supplies throughout the world. Finally, special operations forces (SOF) force presentation is based on an organic force presentation model.

Step One: A Space Model—Independent Action

Today, as the DOD develops cyber war-fighting capabilities, we do not have enough cyber war fighters available to distribute them in a decentralized manner among the GCCs. Using an independent action model would enable USCYBERCOM to support the maximum number of GCC requirements because USCYBERCOM could dynamically shift its limited resources to maximize GCC support. USSTRATCOM has done this for decades with space force presentation. Applying space doctrinal concepts can help USCYBERCOM take immediate measures to improve cyber force presentation to the GCCs.

Gen Kevin P. Chilton, former commander of USSTRATCOM, clearly connected space to cyberspace: “Let’s move into the line of operation that we call cyberspace. Is that a support line for us? You bet. Just like space. Is it global in nature? You bet. Just like space. Do we operate in it every day? You bet. Just like space. In fact what we’re tasked to do is to operate, defend, prepare to attack, and on order attack through this domain.”¹²

USSTRATCOM’s actions in space occur independently of any actions taken in the theater. That command does not rely upon the GCC to carry out some task before it can complete its own tasks in space. How-

ever, the space relationship is inherently a dependent one from the perspective of the GCC. For this reason, GCCs must explicitly state all space support requirements to USSTRATCOM; to do otherwise would potentially disrupt or negatively affect GCC war-fighting operations that depend upon space support.

The space force presentation and C2 template centralize all GCC communications through a specified channel within USSTRATCOM called the joint functional component command space (JFCC Space). That channel communicates with all GCCs and maintains situational awareness of how space operations integrate with all GCC activities. In order to communicate effectively, JFCC Space uses the joint space operations center (modeled after an air and space operations center [AOC] construct) to command and control military space operations effectively.

USSTRATCOM has delegated day-to-day communication activities to JFCC Space. Likewise, JP 3-14, *Space Operations*, notes that “[GCC commanders] may designate a space coordinating authority (SCA) and delegate appropriate authorities for planning, integrating, and coordinating space operations within the operational area.”¹³ In many regards, the SCA serves as the COCOM’s focal point for all space support operations. An SCA can work with JFCC Space for all types of space support issues. The concept of the SCA serves as a cross-domain model for communicating between USSTRATCOM and the GCC. The SCA gathers the requirements from all service and functional components and, on behalf of the GCC, speaks with one voice to USSTRATCOM via JFCC Space.

Achieving USCYBERCOM Independent Action: Cyber Coordinating Authority. To increase the visibility of cyber war-fighting activities, each GCC should adopt the SCA concept for cyber force presentation, in effect creating a cyber coordinating authority (CCA). This action is viable today because it requires limited resources. The greatest challenge to creating a CCA



position within each GCC lies in determining its proper placement. Space doctrine regarding SCA placement defers this decision to each GCC.¹⁴ USCYBERCOM could follow the space doctrinal template of deferring the decision to each GCC, or it could recommend a CCA placement location in order to best integrate USCYBERCOM activities within the GCC scheme of maneuver.

Furthermore, if a CCA were created, USCYBERCOM could continue to complete many of its existing war-fighting functions in a centralized manner. As with space operations, the relationship would remain independent from the FCC perspective and dependent from the GCC perspective. Within the GCC, the services maintain and operate their own networks. USCYBERCOM would direct all CNA and CND-RA activities on behalf of the GCC.

Space doctrine offers insight into cyber force presentation beyond the joint force headquarters level. USSTRATCOM directs its service components (in regard to space) to serve as space proponents within their service, especially the service components of GCCs:

Common responsibilities of each of the Service components are: advocating for space requirements within their respective Services, providing a single point of contact for access to Service resources and capabilities, making recommendations to USSTRATCOM on appropriate employment of Service forces, providing assigned space forces to CDRUSSTRATCOM [commander, USSTRATCOM] and CCDRs [combatant commanders] as directed, assisting in planning in support of space operations and assigned tasking, and supporting CDRUSSTRATCOM and other CCDRs with space mission area expertise and advocacy of desired capabilities as requested.¹⁵

USSTRATCOM disperses the space expertise resident in its service components to the GCC service components to provide the GCCs "space mission area expertise and advocacy," as mentioned above. This approach enables USSTRATCOM to centralize C2 space capabilities while ensuring that the GCC components are aware of space capa-

bilities. These space proponents help GCC components integrate space capabilities within their operations.

Achieving USCYBERCOM Independent Action: Service Component Responsibilities. The service components to USCYBERCOM should act as CNA and CND-RA proponents within each GCC. Those components should send liaisons to champion cyber war-fighting capabilities within the respective GCC service and functional components to maximize USCYBERCOM's contribution to GCC war-fighting activities. Space doctrine provides a template for integrating space within the service components, using the Army's space support elements, the Navy's space operations officers, the Marines' space cadre, and the Air Force's director for space forces.¹⁶ Although USSTRATCOM has no special operations component, it does maintain a space support team construct to send space "proponents" to GCC special operations components.¹⁷ USCYBERCOM's embedded cyber war-fighting proponents would advocate methods by which USCYBERCOM CNA/CND-RA actions could help fulfill GCC requirements, which would then filter back to USCYBERCOM via the GCC CCA.

Step Two: An Air Mobility Model—Interdependent Action

Creating a CCA and dispersing proponents throughout the GCC would lay a strong foundation to build a mature methodology for cyber force presentation. These initial measures to leverage lessons learned from space force presentation should continue to evolve into an interdependent communication model. Such an intermediate step is necessary to transition cyber war fighting from a primarily USCYBERCOM mission to a mission shared between USCYBERCOM and GCCs. The next building block, an interdependent model, would enable each GCC to develop a nascent organic cyber war-fighting capability and develop regional cyber war-fighting subject-matter experts.

Interdependent operations differ from independent operations in that both parties rely on each other for mission accomplishment. Interdependent operations are more complex than independent operations because they require coordination to avoid duplication of effort and to maximize utility. Cyber war-fighting actions occurring at near “network speed” will demand detailed planning and coordination because execution speed may render real-time communication impossible. Air mobility operations offer insight into mitigating the communication challenges of interdependent operations.

Because of limited air mobility resources, global air mobility operations must occur interdependently among the FCC, USTRANSCOM, and GCCs. The DOD simply does not have enough air mobility assets to give each GCC all of the airlift it requires. Therefore, all components must share ownership and collaborate. For this reason, air mobility force “ownership” can be segmented into three distinct classifications: those forces under the command of USTRANSCOM, those under the GCC (such as US Pacific Command), and each service’s organic air mobility forces.¹⁸

USTRANSCOM maintains an air component, US Air Forces Transportation, which, in turn, maintains the 618th AOC. The latter, which communicates with GCC AOCs daily to enable global mobility operations, has responsibility for the majority of inter-theater airlift, while the GCCs’ AOCs have responsibility for the majority of each GCC’s intratheater airlift.¹⁹ The 618th AOC and the GCC AOCs thus work interdependently to ensure the success of the global air mobility enterprise.

Joint doctrine offers the concept of a facilitator to aid this process. JP 3-17, *Air Mobility Operations*, defines the director of mobility forces (DIRMOBFOR) as a “coordinating authority for air mobility with all commands and agencies, both internal and external to the JTF [joint task force], including the JAOC [joint air operations center], the 618th TACC [Tactical Air Control Center, now known as the 618th AOC], and the

JDDOC [joint deployment and distribution operations center] and/or the JMC [joint movement center].”²⁰ JP 3-17 describes the DIRMOBFOR as “normally a senior officer who is familiar with the AOR [area of responsibility] or JOA [joint operations area] and possesses an extensive background in air mobility operations. The DIRMOBFOR serves as the designated agent for all air mobility issues in the AOR or JOA, and for other duties as directed.”²¹ However, because the DIRMOBFOR represents the commander of Air Force forces rather than the joint force air component commander, the director must work with the AOC’s commander and its air mobility division for intratheater airlift operations. Within the theater AOC, the air mobility division will “integrate and direct the execution of theater assigned or attached Service organic mobility forces operating in the AOR or JOA in support of JFC [joint force commander] objectives.”²² The 618th AOC works interdependently with the GCC’s DIRMOBFOR and AOC to ensure that the war fighter receives support via transportation activities and thus obtains the proverbial beans, bullets, and people.

Achieving USCYBERCOM Interdependent Action: Director of Cyber Forces.

The GCC’s CCA should become the equivalent of the DIRMOBFOR for cyber war-fighting capabilities (i.e., a DIRCYBERFOR). The DIRCYBERFOR would continue to work with USCYBERCOM, as the CCA did, for external cyber war-fighting capabilities but would also work with the GCC’s nascent organic cyber war fighters through theater organic C2 channels. In this second step, the GCCs would develop initial cyber war-fighting capability that will require C2 within the GCC itself—external to USCYBERCOM. Unlike the CCA, the DIRCYBERFOR has a doctrinal template in the placement of the DIRMOBFOR underneath the commander of Air Force forces. Although the processes required to integrate airlift clearly differ from those to integrate USCYBERCOM’s nonkinetic fires activities, the concept of a DIRCYBERFOR has value.



Joint doctrine gives the following guidance to JFCs who stand up functional components: "Normally, the Service component CDR with the preponderance of forces to be tasked and the ability to C2 those forces will be designated as the functional component CDR; however, the JFC will always consider the mission, nature and duration of the operation, force capabilities, and the C2 capabilities in selecting a CDR."²³ CNA/CND-RA forces are in such a formative state that GCCs will have difficulty initially determining who to designate as the DIRCYBERFOR. Although not directly grounded in existing joint doctrine, it may be best if both the CCA and DIRCYBERFOR begin at the JFC level and then transition over time to create a cyber functional component at both the GCC and JFC levels in the future.

Achieving USCYBERCOM Interdependent Action: Cyber War-Fighting Element.

The AOC's air mobility division process could serve as a model for a theater C2 structure for incipient cyber forces—a cyber war-fighting element (CWE). Whereas an air mobility division endeavors to direct and execute the JFC's organic airlift mission, the CWE would endeavor to direct and execute the JFC's cyber war-fighting mission. As JFCs seek to integrate cyber war-fighting capabilities within the theater scheme of maneuver, a small CWE could report to the DIRCYBERFOR within the JFC staff.

We should inject a word of caution at this point. Step one, the space model, entailed sending proponents forward to help the war fighter present requirements to USCYBERCOM through the SCA. Step two, the air mobility model, cannot subsequently remove these forces and use them as the foundation for standing up CWEs because each GCC component will still need cyber war-fighting proponents to push war-fighter requirements to the CWE and DIRCYBERFOR.

Achieving USCYBERCOM Interdependent Action: Cyber Operations Center.

As forces become available to establish CWEs, USCYBERCOM should establish a cyber operations center modeled on the 618th AOC to interact with GCCs. The cen-

ter would work with GCC CWEs and DIRCYBERFORs to prioritize, allocate, and utilize global cyber war-fighting capabilities.

Step Three: A USSOCOM Model—Organic Action

During congressional testimony, General Alexander observed that

command and control in cyberspace is still more complicated [than in other domains]. Computer network operations can be regional and global at the same time, and can have effects approaching those of weapons of mass destruction. The devices that give us access to cyberspace exist in the physical world, and in conventional military terms we can say that they are always within the area of responsibility of some geographic combatant command—but they can create effects that take place far away in the area of responsibility of a second command, and they might be enabled to do so by unsuspecting users and their devices located in still a third command's region. Which commander is the mission lead in such a case and is military action appropriate? Which command is supported, and which is supporting? In cyberspace, questions like this must be answered at Internet speed and must take into account our responsibilities and obligations under international law and norms.²⁴

The challenges that General Alexander described are daunting, but they are not unique—in fact, they are quite similar to the challenges we face when combating terrorism and conducting special operations in general. The DOD has carefully studied terrorism and determined that the best method to confront this global challenge is to direct USSOCOM to "synchronize planning of global operations against terrorist networks."²⁵ Because of the similar challenges faced by cyber war fighting and SOF, USCYBERCOM should eventually adopt USSOCOM's force presentation and C2 models.

USSOCOM has chosen to posture forces both globally from the continental United States and regionally (organically) within GCCs. Rather than supporting forces, organic forces are the doctrinal concept for

GCC wartime force presentation defined within JP 1, *Doctrine for the Armed Forces of the United States*.²⁶ Based upon that document, some type of organic cyber forces should also be the end-state goal for GCC force presentation and C2.

Like special operations, war fighting in cyberspace is both global and regional in nature. The SOF community has addressed the dual global and regional nature of terrorism and developed a C2 architecture and force presentation model that provide USCYBERCOM unique and relevant insights. All SOF forces stationed in the continental United States fall under the command authority of USSOCOM, while those assigned to a GCC fall under authority of the GCC commander. As an FCC, USSOCOM provides additional forces on a temporary basis to GCCs for operational employment, with the GCC normally exercising operational control over them.²⁷ The GCC exercises C2 of all assigned and attached special forces through a theater special operations command (TSOC), which provides unity of command and serves as “the primary theater SOF organization capable of performing broad continuous missions uniquely suited to SOF capabilities” and “the primary mechanism by which a geographic combatant commander exercises C2 over SOF.”²⁸ The TSOC commander has three principal roles: JFC of SOF in-theater, theater special operations adviser, and joint force special operations component commander.²⁹ This “triple hatting” makes the position unique within the GCCs. Only this commander is dual hatted as a JFC; GCC service components are dual hatted as component commanders because the service components, unlike SOF, are inherently not joint.

Achieving USCYBERCOM Organic Action: Theater Cyber Operations Command. USCYBERCOM should adopt a USSOCOM force-provider mind-set for each GCC's organic cyber war-fighting component. Each theater would establish a theater cyber operations command (TCYOC) to provide the same type of advocacy and C2 provided by the TSOC for SOF. The TCYOC

commander would serve as JFC for all assigned and attached cyber operations personnel, as theater cyber operations adviser, and as joint force cyber operations component commander. Implementing this concept would clearly elevate cyberspace to an appropriate level of importance.

Achieving USCYBERCOM Organic Action: Joint Cyber Attack Component.

Organic CNA capabilities from multiple services should be combined under a joint cyber attack component. Joint doctrine provides guidance on how the TCYOC should present forces to the GCC: “Functional component commands are appropriate when forces from two or more Military Departments must operate within the same mission area or geographic domain or there is a need to accomplish a distinct aspect of the assigned mission.”³⁰ If multiple services provide cyber attack and defensive response capabilities within the TCYOC, it would be appropriate to create functional components for each. For example, JP 3-05, *Doctrine for Joint Special Operations*, discusses how a joint special operations air component is often created within a joint special operations task force when multiple services have organic air assets.³¹ This component creates a layer of oversight with air expertise above the various SOF aviation elements so that the limited resource can be employed in the most efficient manner.

In the future, a TCYOC probably would have organic service components. The SOF template illustrates a scenario in which multiple services could provide overlapping capabilities. Although many SOF aspects are uniquely connected to a service component, capabilities such as air mobility and airborne fires reside in two service components. Lessons learned from theater operations led to the doctrinal concept of a theater joint special operations air component.

If service CNA/CND-RA capabilities evolved into specialized functions, a study of SOF doctrine would indicate that cyber service components should be adequate. However, overlapping of some aspects of



service-provided CNA/CND-RA capabilities may warrant an additional C2 layer.

Achieving USCYBERCOM Organic Action: Liaison Elements. The GCC cyber war-fighting component must send liaison elements to other functional components. Each GCC maintains a special operations component that must liaise with the other GCC (or subordinate joint task force) components. According to JP 3-05, “To fully integrate SO [special operations] and conventional operations, SOF must maintain effective liaison with all components of the joint force to ensure that unity of effort is maintained and risk of fratricide is minimized.”³² Special operations doctrine addresses specific areas where SOF must send liaison elements:

SOF commanders have available specific elements that facilitate C2, coordination, and liaison. They include . . . the special operations liaison element . . . to provide liaison to the joint force air component commander . . . or appropriate Service component air C2 facility; and SOF liaison officers (LNOs) placed in a variety of locations as necessary to coordinate, synchronize, and deconflict SO within the operational area. . . . All of these elements significantly improve the flow of information, facilitate concurrent planning, and enhance overall mission accomplishment of the joint force.³³

The TSOC integrates personnel within the AOC to coordinate, deconflict, and integrate SOF air, surface, and subsurface operations.³⁴ Special operations doctrine recognizes that communication between organic components within the GCC requires conscious effort and resource allocation.

Achieving USCYBERCOM Organic Action: Cyber War-Fighting Liaison Elements. USCYBERCOM should consider creating cyber war-fighting liaison elements when pursuing TCYOCs. JP 3-05 discusses how the special operations liaison element integrates within the JAOC.³⁵ Members of the former integrate into processes throughout the AOC. Similarly, the cyber war-fighting liaison elements could integrate cyber war-fighting capabilities within the various

JAOC divisions. For example, should the TCYOC plan a significant CNA/CND-RA action, the liaison elements could ensure proper integration and deconfliction of the activity within JAOC processes.

Achieving USCYBERCOM Organic Action: “Service-Like” Responsibilities.

USCYBERCOM should be given appropriate “service-like” responsibilities for cyber-specific requirements modeled after those of USSOCOM. The methodology for SOF force presentation addresses force presentation from both the COCOM and service perspectives. USSOCOM has service-like responsibilities in that it organizes, trains, and equips SOF.³⁶ This includes maintaining its own major force program to procure specialized equipment. For example, the US Air Force will procure a C-130 Hercules and deliver it to Air Force Special Operations Command, which then “upgrades” the C-130 into a special operations AC-130U Spooky gunship. One benefit of this arrangement is that SOF-specific requirements (regardless of the service involved) will receive an appropriate amount of advocacy and not be overshadowed by competing service-level requirements. Analogously, USCYBERCOM should be the DOD’s primary FCC to organize, train, and equip CNA and CND-RA forces.

Aside from USSOCOM, it is the role of the services to equip and educate their members. The services tend to develop and acquire capabilities in accordance with their own priorities, which may not necessarily favor decisions optimized for cyberspace operations. Furthermore, cyberspace is inherently a joint (or even interagency) operating area, yet the services may pursue different technical solutions to realize similar capabilities, such as CNA software. Gaps may also arise in research, development, and acquisition. With service-like responsibilities, USCYBERCOM could provide cyberspace-specific advocacy for systems acquisition, research, and development.

Achieving USCYBERCOM Organic Action: Joint Cyberspace Operations University. To train or, in this case, educate its members, USCYBERCOM should develop a

Joint Cyberspace Operations University modeled after Joint Special Operations University. USSOCOM maintains the latter to provide continuing education for worldwide SOF. The university focuses on educating senior and intermediate special operations leaders and selected non-special-operations decision makers (both military and civilian) in joint special operations.³⁷ Joint Cyberspace Operations University could play an important role in developing future cyberspace leaders. It could partner with service schools in the same way Joint Special Operations University partners with these schools, including the US Air Force's Special Operations School.³⁸ In addition, USCYBERCOM could leverage a number of existing cyber training and education programs, including the Air Force's Undergraduate Cyber Training School, the Air Force Institute of Technology, and the Naval Postgraduate School.³⁹ It may even be possible to implement Joint Cyber Operations University in a decentralized manner. New schools that specifically address war fighting in cyberspace, such as a Cyber School of Advanced Air and Space Studies and a Cyber Weapons Instructor Course within the USAF Weapons School could also meet specific USCYBERCOM requirements.⁴⁰

Conclusion

USCYBERCOM can begin implementation today of a building-block approach to normalize force presentation for cyber war fighting and C2. Each step would build upon actions taken in the preceding one. The first step, taking lessons learned from space, would require little additional manpower. Initially, USCYBERCOM would advocate that the GCCs adopt cyber coordinating authority for cyber force presentation. Simultaneously, USCYBERCOM would direct its service components to send cyber war-fighting proponents to respective GCC service and functional components to better integrate USCYBERCOM's contribution to GCC war-fighting activities.

The second step in the building-block approach would involve transitioning from a space to an air mobility model. The CCA from the previous step would evolve into a DIRCYBERFOR for cyber war-fighting activities. As forces become available, GCCs would establish cyber war-fighting elements, and USCYBERCOM would stand up a cyber operations center to interact with GCCs.

Within the air mobility model, USCYBERCOM cyber war-fighting proponents would remain embedded within the GCC, as they were under the space model. However, within the USSOCOM model, these USCYBERCOM proponents would evolve into liaisons from the GCC cyber war-fighting component to the other GCC components. With this building block, the individuals would remain, but their C2 chain would change from USCYBERCOM to the GCC.

In the third step (the USSOCOM model), the relationship between the theater JFC staff and USCYBERCOM C2 center would evolve to one of an FCC responsible for global cyber war-fighting operations and a GCC cyber war-fighting component responsible for regional cyber war-fighting activities. The USCYBERCOM C2 center would also maintain responsibility for synchronizing regional actions between GCCs. This synchronization responsibility would require close coordination between the GCC cyber components and the USCYBERCOM C2 center.

USSOCOM has utilized its "service-like" responsibilities to advance special operations war-fighting capabilities. Adapting USSOCOM's service-like attributes could aid USCYBERCOM in much the same manner. The importance of education in developing a cyber war-fighting force cannot be overstated, and Joint Special Operations University offers a model that USCYBERCOM can adapt.

Although the DOD still grapples with the very concept of war fighting in cyberspace and remains unclear about what actions would constitute acts of war, it must still address the question of how to present cyber forces and exercise C2 of them. Cyber-



space is definitely a contested domain, but is it a unique one? Although some aspects of cyberspace are undoubtedly unique, we argue that in the area of force presentation and C2, cyberspace is analogous to other war-fighting domains; hence, we can apply lessons from space and air operations to

cyberspace. We therefore recommend that USCYBERCOM adopt our doctrinally based blueprint for presenting and exercising C2 of cyber war-fighting forces. ★

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Notes

1. Joint doctrine defines *cyberspace* as a global domain. See Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 30 September 2010), http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

2. Air Force Doctrine Document 3-12, *Cyberspace Operations*, 15 July 2010, 14, <http://www.e-publishing.af.mil/shared/media/epubs/AFDD3-12.pdf>.

3. JP 3-13, *Information Operations*, 13 February 2006, IV-5, http://www.dtic.mil/doctrine/new_pubs/jp3_13.pdf.

4. Lt Gen Keith B. Alexander, "Warfighting in Cyberspace," *Joint Force Quarterly* 46 (Third Quarter 2007): 60, <https://digitalndulibrary.ndu.edu/cgi-bin/showfile.exe?CISOROOT=/ndupress&CISOPTR=20001&CISOMODE=print>.

5. JP 1-02, *Department of Defense Dictionary*, defines *computer network attack* as "actions taken through the use of computer networks to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves" (93); *computer network defense* as "actions taken to protect, monitor, analyze, detect, and respond to unauthorized activity within the Department of Defense information systems and computer networks" (93); and *computer network exploitation* as "enabling operations and intelligence collection capabilities conducted through the use of computer networks to gather data from target or adversary automated information systems or networks" (93).

6. CND-RAs are "deliberate, authorized defensive measures or activities that protect and defend DOD computer systems and networks under attack or targeted for attack by adversary computer systems/networks. RAs extend DOD's layered defense-in-depth capabilities and increase DOD's ability to withstand adversary attacks." Chairman of the Joint Chiefs of Staff Instruction 6510.01E, *Information Assurance (IA) and Computer Network Defense (CND)*, 12 August 2008, GL-7, http://www.dtic.mil/cjcs_directives/cdata/unlimit/6510_01.pdf.

7. JP 3-13, *Information Operations*, IV-5.

8. JP 6-0, *Joint Communications System*, 10 June 2010, III-1, http://www.dtic.mil/doctrine/new_pubs/jp6_0.pdf.

9. For a more in-depth discussion on the importance of separating war fighting in the domain from actions taken to maintain access to the domain, see Dr. Robert F. Mills, Maj M. Bodine Birdwell, and Maj Kevin R. Beeker, "Apples & Oranges: Operating and Defending the Global Information Grid," *IAnewsletter* 13, no. 2 (Spring 2010): 39-40, http://iac.dtic.mil/iatac/download/Vol13_No2.pdf.

10. Alexander, "Warfighting in Cyberspace," 60.

11. JP 1, *Doctrine for the Armed Forces of the United States*, 2 May 2007 (incorporating change 1, 23 March 2009), ii, III-12-13, http://www.dtic.mil/doctrine/new_pubs/jp1.pdf.

12. Gen Kevin Chilton, "Remarks to the November 2008 Air Force Association Global Warfare Symposium," <http://www.stratcom.mil/speeches/17/>.

13. JP 3-14, *Space Operations*, 6 January 2009, III-2, http://www.dtic.mil/doctrine/new_pubs/jp3_14.pdf.

14. Ibid.

15. Ibid., IV-7-8.

16. Ibid., IV-8-11.

17. JP 3-05, *Doctrine for Joint Special Operations*, 17 December 2003, IV-7, http://www.dtic.mil/doctrine/new_pubs/jp3_05.pdf.

18. JP 3-17, *Air Mobility Operations*, 2 October 2009, I-7, 9, http://www.dtic.mil/doctrine/new_pubs/jp3_17.pdf.

19. Ibid., II-2.

20. Ibid., II-4.

21. Ibid., II-4-5.

22. Ibid., II-8.

23. JP 1, *Doctrine for the Armed Forces of the United States*, V-19.

24. House, *Statement of General Keith B. Alexander, Commander, United States Cyber Command, before the House Committee on Armed Services, 23 September 2010, 111th Cong., 2nd sess., 6-7*, http://www.defense.gov/home/features/2010/0410_cybersec/docs/USCC

%20Command%20Posture%20Statement_HASC_22
SEP10_FINAL%20OMB%20Approved_.pdf.

25. "Mission of U.S. Special Operations Command," accessed 24 September 2010, <http://www.socom.mil/SOCOMHome/Pages/About.aspx>.

26. JP 1, *Doctrine for the Armed Forces of the United States*, III-12, 13.

27. JP 3-05, *Doctrine for Joint Special Operations*, III-2, 3.

28. *Ibid.*, III-4.

29. *Ibid.*

30. JP 1, *Doctrine for the Armed Forces of the United States*, V-4.

31. JP 3-05, *Doctrine for Joint Special Operations*, III-9.

32. *Ibid.*, viii.

33. *Ibid.*, III-10.

34. *Ibid.*, III-12.

35. *Ibid.*

36. *Ibid.*, III-2.

37. *Ibid.*, A-1.

38. For basic information about the school, see "U.S. Air Force Special Operations School," Air Force Special Operations Command, accessed 10 November 2010, <http://www.afsoc.af.mil/usafsos/>.

39. See "New Undergraduate Cyber Training School Opens," 17 June 2010, accessed 6 December 2010, <http://www.keesler.af.mil/news/story.asp?id=123209936>; "Graduate School of Engineering and Management, Center for Cyberspace Research (CCR)," accessed 10 November 2010, <http://www.afit.edu/en/ccr/>; and "Center for Cyber Warfare Established at NPS," accessed 10 November 2010, <http://www.nps.edu/Academics/Institutes/Cebrowski/News-and-Events/cybersummit/docs/CyberCenter.pdf>.

40. Maj Paul D. Williams, "Cyber ACTS/SAASS: A Second Year of Command and Staff College for the Future Leaders of Our Cyber Forces," *Air and Space Power Journal* 23, no. 4 (Winter 2009): 21-29, <http://www.airpower.au.af.mil/airchronicles/apj/apj09/win09/win09.pdf>.

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What's in a Name?

Beyond Rescue As We Know It

Maj Samuel Kwan, USAF*

Operational art is “the application of creative imagination . . . to design strategies, campaigns, and major operations and organize and employ military forces.”¹ The visual arts epitomize creativity while challenging viewers to interpret an artist's message. In some instances, the artist's intent is quite clear, as in Paul Gauguin's painting *Where Do We Come From? What Are We? Where Are We Going?*, which contemplates humankind's existence and evolution in terms of birth, life, and death.² Examining other subjects in a similar manner may also prove worthwhile. By applying Gauguin's three questions to the Air Force's personnel recovery (PR) mission, we can design a road map for the future.

Throughout the evolution of Air Force rescue, one recurring theme—the redesignation of forces—has more or less coincided with changes in capabilities and increases or decreases in the scope of the mission. The latest and perhaps most substantial change to affect Air Force rescue in the last several decades is the June 2009 adoption of PR as one of the service's core functions.³ By doing so, the Air Force elevated the importance of the mission by formally assuming ownership and committing to this capability on a par with air superiority, rapid global mobility, special operations, and other functions. As the only service to have PR as a core function, the Air Force is recognized as the Department of Defense's (DOD) expert in this mission. But this increased focus calls for another name change—one long overdue. Specifically, such a seemingly minor initiative as redesi-

gnating “rescue squadrons” as “personnel recovery squadrons” can become a catalyst that energizes further changes. More than just a new name and flight-suit patch, the concept of a PR squadron will define how the Air Force organizes, trains, and equips PR forces to operate in the joint environment while professionally developing those personnel to perform duties beyond the tactical level in order to lead the rescue mission into the future.

Where Do We Come From?

To find out where we come from, we must study our history. Inception of the modern rescue force occurred on 13 March 1946 with the establishment of the Air Rescue Service (ARS), led by Col Richard Kight, under Air Transport Command.⁴ Colonel Kight (later a brigadier general) was responsible for coining the “Code of an Air Rescue Man,” which ends with the well-known oath “These things [we] do that others may live.”⁵ Following the Korean War, the ARS reverted to a conventional peacetime civil search and rescue (SAR) mission.⁶ According to one historian, “Most USAF leaders believed that the Korean experience had been an aberration in warfare, and they expected that few lessons were to be learned.” This attitude led to cuts in ARS's budget and personnel, which resulted in the loss of rotary-wing doctrine and expertise.⁷ When the need once again arose for combat search and rescue (CSAR) during the Vietnam War, the Air Force assembled forces and renamed the

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ARS the Aerospace Rescue and Recovery Service (ARRS) in January 1966. However, by then, those forces had to relearn many of the lessons of Korea, so the failed early years of the Vietnam conflict became known as the “dark age of SAR.”⁸ Nevertheless, Air Force rescue later gained fame in Vietnam for daring missions involving “Jolly Green Giant” helicopters that plucked downed Air Force and other services’ aircrews out of the dense jungle. Airmen such as A1C William Pitsenbarger, a pararescueman and recipient of the Medal of Honor, gave their lives to save others. Thus, the latter portion of the Vietnam War became known as the “golden age” of rescue.⁹

Unfortunately, Air Force rescue atrophied again after Vietnam, and the subsequent 15 years saw a loss of combat rescue capability. In the 1980s, Twenty-Third Air Force owned the mission for a time, under United States Special Operations Command (USSOCOM), which later divested responsibility to Military Airlift Command, which then revived the original designation, Air Rescue Service.¹⁰

The beginning of Operation Desert Storm brought about the hasty reassembling of CSAR forces and operational command and control (C2) architecture. As Darrel Whitcomb observes, “In the summer of 1990, CSAR in toto was not in the best of shape,” due largely to “force reductions, budget decisions, and reorganizations.”¹¹ Additionally, the transfer of HC-130 and MH-53 aircraft and experienced personnel from the ARS to USSOCOM resulted in the tasking of Special Operations Command Central, rather than ARS, with the CSAR mission in Desert Storm. However, instead of the special operations component, the joint rescue coordination center—an entity that belonged to the conventional air component of Central Command Air Forces—was assigned the C2 responsibility. This divided architecture meant that Special Operations Command Central owned the primary recovery mission for all service components while Central Command Air Forces, which had no helicopters in-theater, exercised C2 for that

mission.¹² Such a problematic command relationship between components produced a significant lesson learned from the conflict.

Apart from those in Desert Storm, other recovery missions in the 1990s famously included the rescue of Capt Scott O’Grady by a Marine Corps tactical recovery of aircraft and personnel team and the recoveries, by Air Force special operations forces, of an F-117 and an F-16 pilot during Operation Allied Force. Meanwhile, conventional Air Force rescue units struggled to find their identity. On 1 February 1993, Air Mobility Command (the successor to Military Airlift Command) transferred the ARS to Air Combat Command, which in turn disbanded it and aligned some rescue units with their geographic major commands (e.g., US Air Forces in Europe and Pacific Air Forces).¹³ At the same time, Air Force CSAR squadrons, known as “air rescue squadrons,” became “rescue squadrons.” Although Air Force Special Operations Command absorbed rescue units in 2003 and Air Combat Command reinherited the mission in 2006, no significant shift occurred in the organizing, training, or equipping of these units.

Prior to Operations Enduring Freedom and Iraqi Freedom, traditional Air Force CSAR forces sat alert in Turkey and Kuwait for Operations Northern and Southern Watch, respectively, waiting for the distress call that never came, much as they had during Desert Storm. Today, Air Force rescue forces are certainly engaged in combat and heroically going into harm’s way to save lives, but the service’s PR mission is currently stagnating from the combination of high operating tempo (OPTEMPO) and difficulty adapting to change.

What Are We?

In the 1990s, the DOD adopted the term *personnel recovery*, defined as “the sum of military, diplomatic, and civil efforts to prepare for and execute the recovery and reintegration of isolated personnel.”¹⁴ The Joint Personnel Recovery Agency was es-



tablished within US Joint Forces Command in 1999 as the DOD's office of primary responsibility for PR.¹⁵ Although CSAR is only a subset of PR, most people are more familiar with the former, the means by which "the Air Force accomplishes the PR recovery task. It is the Air Force's preferred mechanism for personnel recovery in uncertain or hostile environments and denied areas."¹⁶

The term *search* in CSAR is an antiquated misnomer that brings to mind aircraft flying in hostile airspace "searching" for a downed Airman or other isolated personnel. In reality, the "locate" task of PR now usually happens at the operational, not tactical, level. The air and space operations center, joint PR center, or component PR coordination cell utilizes the gamut of intelligence, surveillance, and reconnaissance assets; satellites in the Global Positioning System; and survival radios, such as the Combat Survivor Evader Locator, to take the "search" out of search and rescue before recovery forces ever launch.¹⁷ Understanding the operational-level capabilities and responsibilities of PR C2 is essential for professional development, which will create future PR leaders who practice operational art. However, among the Air Force "PR triad" of HH-60, HC-130, and Guardian Angel weapon systems, only the Guardian Angel community is broadly educated on all phases of the PR mission, from reporting through reintegration of recovered personnel.¹⁸

The Air Force trains our PR triad to be tactical experts in recovery—no small feat since newly assigned personnel can take up to two years to progress from initial skills training to fully mission qualified status. The Air Force needs to realize a return on its training investment by deploying and employing our PR forces in combat, but PR units have become victims of their own success. Without a doubt, Air Force PR represents the most highly trained and proficient tactical rescue force in the world. Our PR forces are invaluable to the joint team because no other service possesses the same capability.¹⁹ Recovery of personnel by Airmen is as old as military aviation itself, but

the wars in Afghanistan and Iraq have shown that the old paradigm of CSAR's saving a fighter pilot from enemy territory amounts to only a fraction of what PR forces are tasked to do. The vast majority of isolated personnel are ground-component members—US and coalition—needing extraction from the fight. The Air Force performs this mission immensely well. HH-60 crews and Guardian Angels in particular have saved thousands of lives by flying in bad weather, at night, and under hostile fire to evacuate and provide immediate medical care to wounded soldiers and civilians. In 2009 alone, Air Force crews were credited with a combined 768 saves and 3,594 assists in Enduring Freedom and Iraqi Freedom.²⁰

This persistent need for Air Force combat capability in Afghanistan, Iraq, and elsewhere has resulted in a low-supply, high-demand PR force that spends an average of one day deployed for every day spent at home station, a ratio known as a "1:1 dwell." Even though this high OPTEMPO gives PR personnel extensive tactical experience, it deprives them of the chance to acquire additional PR skills and greater operational experience—or to pursue other career-development opportunities. As the 1980s and 1990s generation of senior leaders retires from active service, combat veterans of Afghanistan and Iraq will require more than tactical skills to lead and prepare Air Force and joint PR forces in future operations. They should also have background in PR C2 and should serve in DOD, joint, or combatant command staffs to gain operational background and strategic acumen.

Among the officer corps, are we merely individual combat rescue officers or HC-130 and HH-60 pilots? Or should we instead be known as PR officers? Currently, the Air Force specialty codes (AFSC) for an HC-130 pilot and navigator are 11R and 12R, respectively, which groups them with reconnaissance, surveillance, and electronic warfare aviators, while HH-60 pilots (AFSC 11H) are aligned with other helicopter pilots. Along with combat rescue officers, PR is the proper specialty of HC-130 and HH-60 offi-

cers, just as fighter or mobility crew members are categorized into those respective mission areas. PR officers should hold the AFSCs 11P, 12P, and 13P (replacing the 13D control-and-recovery designation currently held by combat rescue officers). These AFSCs would more accurately define and identify the PR specialty and its associated knowledge, placing more emphasis on the core function than on individual weapon systems. Similarly, the Air Force created a new 18X AFSC in October 2009 for operators of remotely piloted aircraft in order to recognize, capture, and develop the unique skills in that community.²¹

By adopting PR AFSCs, the Air Force would do a better job of capturing, developing, and retaining PR expertise. We would thereby increase the pool of officers available to fill positions on higher headquarters staffs or in deployed joint PR centers and PR coordination cells. PR officers working in joint operational and strategic environments would tell (and sell) the Air Force's PR story. By increasing the number of operational and staff positions in combatant commands worldwide, we also would enhance opportunities to educate partner nations on PR, thus building their capacities and helping them establish organic PR capabilities.

The 23rd Wing, parent unit of all of the Air Force's active duty PR forces, already engages in limited activities at the tactical level that "build partnerships," another of the service's 12 core functions.²² PR Airmen recently advised Colombian forces on air-drops and infiltration/exfiltration operations.²³ These types of efforts in theater security cooperation, however, are constrained by the limited availability of Air Force PR experts, who are heavily tasked to support wartime commitments. We need to find a way to simultaneously decrease the OPTEMPO of our deployments but increase our role in theater security cooperation since experiences in building partner capacity undoubtedly contribute to preparing well-rounded Airmen to lead PR squadrons.

Without broadly developing our people as well as our operational and strategic

competency, Air Force PR, despite its unmatched capability and success in recovery operations, risks losing relevancy in the joint environment. In a meeting with the Defense Writers Group, held shortly before termination of the CSAR-X helicopter-replacement program, John Young—former undersecretary of defense for acquisition, technology, and logistics—opined, "I don't know that that [CSAR] community has to have its own set of assets for the occasional rescue mission. We have new things coming on line like V-22s and other things that can be pressed into service. When we do our rescue mission we're going to do a come-as-you-are operation anyway, unless all the CSAR assets are pre-positioned for that."²⁴ Apart from demonstrating a fundamental misunderstanding of the role of PR in today's fight and a disregard for the risks of ad hoc recovery by untrained or unprepared assets, the undersecretary's statement suggests that Air Force PR is narrowly focused and its capability easily duplicated. PR forces, like special operations forces, cannot be mass produced; however, Air Force PR does indeed have a narrow focus. In reality, the joint train has left the station, and Air Force PR needs to get on board. PR officers on staff have a duty to advocate the mission and educate our senior leaders on PR issues ranging from plans and operations to acquisition, requirements, strategy, policy, and doctrine.

Where Are We Going?

CSAR-X, the Air Force's planned rescue-helicopter replacement program, appeared to embody the future of combat rescue until the secretary of defense cancelled it, asking whether PR "can only be accomplished by yet another single-service solution."²⁵ Because current operations and the "long war" necessitate meeting the urgent equipment needs of war fighters, the Air Force has put a high priority on acquiring new recovery aircraft. Despite the CSAR-X cancellation, an HH-60 operational-loss-replacement plan



exists to compensate for 20-plus years of aircraft losses during combat and training. In addition, the Air Force has begun recapitalizing our legacy HC-130 fleet with the HC-130J model.²⁶ But we must still address the long-term definition of joint PR. New technology and iron on the ramp will mollify frustrations associated with aging equipment and increase our ability to survive and operate against increasingly capable enemy air defense threats. Nevertheless, new aircraft and associated tactics, techniques, and procedures will be far less useful without smart personnel who understand strategy and desired effects. DOD leadership has already recognized that we need to adapt. Meeting joint expectations requires widening the scope of the Air Force's traditional thinking with regard to rescue.

our core professional military education in PR, actively increasing the Air Force's PR participation in collateral missions and exercises, widely exchanging PR specialists among members of the joint community, and incorporating PR into the AirSea Battle operational concept.

Within the Joint Personnel Recovery Agency, the Personnel Recovery Education and Training Center exists "to educate DoD and selected other national and international Personnel Recovery professionals, both civilian and military, in the art and science of planning and executing joint Personnel Recovery operations."²⁷ The center's courses train and educate joint officers and enlisted members but primarily instruct combat rescue officers or a select few operational staffers, not only on the recovery

New technology and iron on the ramp will mollify frustrations associated with aging equipment and increase our ability to survive and operate against increasingly capable enemy air defense threats. Nevertheless, new aircraft and associated tactics, techniques, and procedures will be far less useful without smart personnel who understand strategy and desired effects.

Senior leaders such as Mr. Young will continue to take the Air Force's CSAR competency for granted, and our tactical units will continue their 1:1 dwell ratio because other nations, services, or components are unable or unwilling to dedicate assets to recover their own personnel. For those reasons, we should consider several initiatives to train others while advancing our own PR forces. These initiatives include expanding

phase of PR but also on the other PR execution tasks of reporting, locating, supporting, and reintegrating. Courses offered include PR Plans and Operations as well as Reintegration Team Responsibilities.²⁸ Unfortunately, training slots for these valuable courses are extremely limited.

On 9 August 2010, Secretary of Defense Robert Gates announced his intent to eliminate Joint Forces Command. Naturally, we

must consider the cascading effects, including what will become of the Joint Personnel Recovery Agency. With or without that agency, the Personnel Recovery Education and Training Center could expand to become a “PR University” that would incorporate compulsory and optional classes as part of either mission qualification or career field upgrades.²⁹ Additionally, the center would be an ideal forum for classes on rescue history and case studies that would help build a foundation for new PR officers. PR University’s cadre would include experienced PR officers and specialists from all the services.

An article entitled “A Rescue Force for the World: Adapting Airpower to the Realities of the Long War” coherently maps the future role of Air Force PR.³⁰ Specifically, it proposes that we extensively employ Air Force rescue assets for disaster response and theater security cooperation, in large part to engage other nations and win the hearts and minds of their citizenry. Along those same lines, PR squadrons, through greater participation in collateral missions and exercises, could broaden their Airmen, develop their future leaders, and increase credibility and relevancy in the joint and interagency arena. Counterdrug operations with the Department of Homeland Security, noncombatant evacuation exercises with the Marine Corps, and humanitarian relief with the US Agency for International Development represent just a few examples of activities for which Air Force PR experts are ideally suited to contribute. Exercise Angel Thunder, the “premier personnel recovery exercise in the world,” held annually in the Arizona desert, serves as an excellent example to emulate and expand upon.³¹ We should also incorporate PR scenarios into all Red Flag and Green Flag exercises since joint and coalition partners regularly attend them.

According to joint doctrine, PR can and should involve air, land, or naval forces—whatever is necessary to fulfill the mission.³² Exchange tours offer an ideal way to increase participants’ knowledge of the capabilities of sister services and components as

well as enhance joint integration. Air Force HH-60 crews, for example, would embed with Marines to exercise tactical recovery of aircraft and personnel or in Navy SAR units to gain proficiency in shipboard operations and C2, eventually returning to Air Force units to share their experiences. Obviously, this is not a new idea, but we should break down the old construct that exchange tours must be few and far between. Rather than special duties, these assignments should become a normal part of career progression. Increasing exchange opportunities would also allow our sister services to learn from the best—Air Force PR experts. Our service still possesses the preponderance of PR forces and expertise; consequently, the Air Force PR coordination cell is normally designated the joint PR center as well.³³ No other service has as many dedicated recovery assets, including aircraft; officer and enlisted aircrews; pararescuemen; and survival, evasion, resistance, and escape instructors. Our PR officers and specialists will serve as enablers who can train, educate, and increase the capacity of our sister services to fulfill the inherent doctrinal responsibility of recovering their own personnel, thereby reducing the OPTEMPO of stressed Air Force PR forces.

The AirSea Battle concept, initiated in September 2009 by the chief of staff of the Air Force and the chief of naval operations, offers a perfect forum for joint discussion of PR. Thus far, the concept has emphasized major combat operations in antiaccess environments.³⁴ Although this type of conflict seems to set up a “classic” downed-aviator CSAR scenario, regardless of the nature of the mission, the current AirSea Battle concept makes no mention of PR as a critical collaboration between air and naval forces. It would almost certainly become the Air Force’s responsibility to recover naval aviators located beyond the range of Navy rescue forces, so we should not overlook this strategic opportunity to enhance Air Force–Navy integration. Further advancement of AirSea Battle should include discussion of



shared PR doctrine; training; C2; and tactics, techniques, and procedures.

Conclusion

We have never had a better opportunity to advance the future of joint PR. Specifically, we should leverage the increased focus on the mission, brought about by the designation of PR as an Air Force core function, by further expanding our role. Organizing, training, equipping, and committing to *personnel recovery*—not just the CSAR skill set—will define the future relevancy of Air Force PR forces. Along with expanding the role of AirSea Battle, the other initiatives will lead to a more capable joint PR community. Today, however, we find ourselves in a protracted high OPTEMPO that stretches our people and equipment to their limits. The better the Air Force performs our tactical recovery mission, the more likely it is that the DOD will continue to depend on us to provide that combat capability for all services and components. By maintaining the status quo, the Air Force risks creating only tactical experts without

the requisite operational know-how and strategic vision to lead PR in the current and future joint environment.

Remembering where we came from, we must build on the contributions, lessons learned (both good and bad), and legacy of Airmen who came before us. To take the next evolutionary step, we should redesignate Air Force rescue units as PR squadrons, led by PR officers whose professional development makes them experienced not only in tactical and operational warfare but also in strategic thinking. These PR squadrons should integrate exchange personnel from sister services and participate in a wide range of joint and interagency missions. Of course, by increasing our depth and taking on additional collateral missions, we risk becoming the proverbial jack-of-all-trades and master of none. Balancing tactical expertise and combat commitments with this expanded definition of Air Force PR will prove challenging, but by continually applying operational art and creative imagination to this dynamic mission, we will take it beyond rescue as we know it. ✪

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Revelations in Haiti

The Side Effects of New Priorities for Remotely Piloted ISR Aircraft

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The RQ-4 Global Hawk, MQ-1 Predator, and other remotely piloted intelligence, surveillance, and reconnaissance (ISR) platforms typically perform combat missions to defeat improvised explosive devices or locate and neutralize enemy forces. However, the US response to the devastating earthquake near Port-au-Prince, Haiti, on 12 January 2010 challenges the paradigm that ISR simply counteracts threats.¹ In response to the Haiti disaster, the international community initiated a massive recovery and relief effort.² The United States alone deployed more than 22,000 military personnel, 30 ships, and 300 aircraft in support of Operation Unified Response.³ The deployed aircraft included several manned and remotely piloted ISR platforms.

Unified Response was the first international deployment of remotely piloted ISR assets in support of a humanitarian operation although some of these assets assisted domestically after Hurricane Katrina.⁴ The RQ-4 and MQ-1 provided time-critical imagery support and overwatch for military and civilian relief workers in Haiti. However, use of these military assets to support humanitarian operations complicates future decisions regarding their employment. A complication emerges when remotely piloted aircraft (RPA) tackle problems beyond their traditional roles of finding, fixing, tracking, and engaging targets. Specifically, such a new role gives policy makers, war

fighters, and the public a different perspective of ISR. Providing humanitarian support via remotely piloted ISR platforms contests the established paradigm by creating debate about when and how to employ these assets. Unified Response reveals that the United States *can* respond to international humanitarian operations with ISR aircraft whenever decision makers choose to do so. Consequently, the operation demonstrates that the ISR community must be prepared to conduct these operations with the necessary manpower, support, and equipment.

The “When” Challenge

The calculus for determining when the United States should employ ISR RPAs is influenced by these aircraft’s operational benefits of rapid deployability, long endurance, and lack of risk to personnel, which may persuade policy makers to use them to aid foreign states when disaster strikes. However, the prospect of using scarce ISR platforms for humanitarian operations creates a quandary for decision makers, who must determine priorities for supporting combat and noncombat operations, and for ISR operators, who must execute those priorities.

For example, the day the Haiti earthquake occurred, the Air Force had deployed an RQ-4 to support combat operations in Iraq and Afghanistan. Because

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Pres. Barack Obama ordered an aggressive response by the US government to the Haiti disaster, including the allocation of ISR assets to United States Southern Command (USSOUTHCOM) for humanitarian operations in that country, the RQ-4 priority for Unified Response temporarily exceeded that of US Central Command (USCENTCOM) for replacing its RQ-4 aircraft in support of fully engaged combat forces.⁵ It is possible that future priorities may prove more ambiguous, complicating the division of ISR assets between combat and noncombat operations. Competing policy choices between humanitarian and combat operations do not constitute a new concept, but some decision makers do not consider situations like the one in Haiti a military priority at all. Regarding the response to Hurricane Katrina, a domestic disaster, a House of Representatives committee report observed that the military's sole responsibility involved fighting and winning America's wars.⁶ Such thinking reflects an enduring debate concerning the use of weapons of war for operations other than war. However, the new expectation for a US response to international disasters now includes ISR, and any questions concerning its usefulness for humanitarian operations have been answered.

Employing remotely piloted ISR platforms during such operations yields multiple benefits for the United States, not only by enhancing national security but also by increasing US moral authority and strengthening international friendships by assisting people in need. Furthermore, policy makers demonstrate to the American people that their investment in weapon systems is useful for a wide range of missions, including humanitarian operations. Additionally, the military shares information with nongovernmental organizations (NGO), compensating for shortfalls in their capabilities. This symbiosis fosters closer relationships between the military and relief organizations with which the military often partners in a variety of situations.⁷ If policy makers assign humanitarian opera-

tions a higher priority than combat operations in order to attain the benefits mentioned above, then ISR operators should expect an expanded role in future US responses to international disasters.

The "How" Challenges

Like the ISR operators in Unified Response, their counterparts in future situations that require ISR support must overcome several obstacles before they can successfully conduct an expanding mission set which encompasses humanitarian operations. First, these personnel must deal with an increased operations tempo that may strain finite data collection and exploitation capacity. The pool of analysts, as well as their specialized equipment, that dynamically collects and exploits ISR data as usable intelligence represents a critical but limited resource. Therefore, additional, concurrent, multitheater ISR sorties—along with varying mission types (i.e., a mixture of combat and humanitarian operations) that demand different analytical emphases—will likely strain these limited mission-management and exploitation resources. Second, as the Air Force continues to increase the pace of distributed ISR operations, personnel who perform missions will bear additional workloads and psychological stresses.⁸ Third, ISR operators who disseminate unclassified intelligence must deal with the fact that standard declassification procedures for releasing large amounts of data within hours or even minutes of collection do not exist for aircraft like the RQ-4. Operation Unified Response reaffirmed the truism that the effectiveness of intelligence depends in part on its timeliness.

To address the first and second concerns, mentioned above, the Air Force needs to assign a sufficient number of ISR operations professionals to current and emerging scenarios, possibly including humanitarian operations. Moreover, the service should commission a study of ISR operators for the purpose of developing a baseline under-



standing of problems associated with conducting continuous distributed ISR missions. Perhaps future or concurrent studies could concentrate on other types of distributed missions, such as those conducted by space personnel—a community highly experienced in distributed operations.⁹ The third issue justifies combatant commands' establishing uniform declassification standards to alleviate confusion in the event of another Haiti-type disaster that may call for prompt declassification of a substantial amount of intelligence. Additional or changing ISR priorities require a full-spectrum solution that considers not only hardware but also the software, processes, and human aspects of distributed ISR operations.

ISR personnel must contend with an upswing in operations tempo. By 2015 the Air Force expects to have at least 380 ISR aircraft, about 50 percent more than its current inventory of 250; this growth—primarily in remotely piloted platforms, combined with the possibility of more Haiti-like contingencies—will drive a need for more personnel to perform analytical, flight, and mission-management duties.¹⁰ In a recent study, the Government Accountability Office identified mission-management and analytical capacities as critical ISR shortfalls, noting that “since 2002, [the Department of Defense] has rapidly increased its ability to collect ISR data in Iraq and Afghanistan; however, its capacity for processing, exploiting, and dissemination is limited and has not kept pace with the increase in collection platforms and combat air patrols.”¹¹ Lt Gen David Deptula, retired, former Air Force A-2 (intelligence), best characterized the situation: “In the not-too-distance [sic] future, we’ll be swimming in sensors and drowning in data.”¹² RPAs create a need for more analysts since they fly longer sorties than manned aircraft and therefore collect much more data, which analysts must transform into intelligence. The ISR shortfalls identified by the Government Accountability Office are reflected in human terms by the number of ISR mission commanders and analysts available to collect and inter-

pret data from ISR platforms networked to the Air Force distributed common ground/surface system (DCGS).¹³ Not only analysts but also pilots, sensor operators, and mission intelligence coordinators of the 12th and 99th Reconnaissance Squadrons and the 432nd Air Expeditionary Wing feel the effects of increased operations tempos during contingencies such as Unified Response.

The DCGS functions as the brain behind the ISR platforms that supply inputs to the overall system. The platforms, coordinated by ISR mission operations commanders, collect data for DCGS analysts located at worldwide nodes managed by the 480th ISR Wing. This unit managed intelligence exploitation, tasking, and collection for Unified Response while simultaneously supporting global combat requirements by requiring mission operations commanders and analysts to “surge” by working longer hours.¹⁴ Even under normal conditions, analysts do not exploit all of the data collected by ISR platforms. USCENTCOM officials reportedly used “less than one-half of the electronic signals intercepts collected from the Predator.”¹⁵ Surge operations beyond the 12-hour days currently demanded by normal ISR operations are to be expected during ad hoc contingencies; however, more frequent humanitarian contingencies can severely strain our already limited analytical capacity. The Air Force’s proposed 50 percent increase in ISR platforms over the next four years will place additional pressures on ISR mission management and exploitation.¹⁶

Because policy makers might have no knowledge of the vast amount of data collected by these additional platforms, they could underestimate the number of analysts needed to transform that information into useful intelligence. The increasing number of aircraft and accelerated usage brought about by humanitarian operations may unexpectedly confront the Air Force with the problem of “too much data and not enough intel.”¹⁷ Consequently, tactical and operational ISR commanders might find themselves in the precarious situation

of choosing between greater personnel workload and diminished mission availability.¹⁸ Although the simple solution would call for more personnel, the use of discretion when deciding whether to become involved in contingency operations will continue to be the key factor in maintaining a proper balance of force structure. In the spring of 2010, the 480th ISR Wing began adding approximately 2,500 intelligence personnel, predicated on USCENTCOM's plan to increase its approximately 40 full-motion-video combat air patrols to 65.¹⁹ However, this expansion does not take into account emerging priorities such as humanitarian operations.²⁰

If the number of contingency operations (such as Unified Response) consistently exceeds projected USCENTCOM levels for the next several years, a faster operations tempo accompanied by surge operations for current DCGS personnel will become more likely. To alleviate the subsequent stress on mission-management and analytical capacities, the Air Force may have to add more ISR operators than the 2,500 currently planned. The Department of Defense has undertaken a study of ways to determine specific numbers of personnel necessary to meet the escalating demand for ISR analysis, but its date of publication remains uncertain.²¹ Even though the military should certainly complete such evaluations in order to attain greater clarity regarding the actual manning dilemmas faced by the ISR community, other problems may exist as well.

ISR operators are subject to psychological stress occasioned by the changing requirements mentioned above. Many ISR operations take place from in-garrison locations throughout the United States every day and around the clock; indeed, the DCGS supports a variety of missions in all six geographic combatant commands. For the 13th Intelligence Squadron, Unified Response added to its many duties, albeit with a humanitarian rather than a combat focus. A sign outside the squadron's operations floor that reads "Welcome to the

AOR [area of responsibility]" reflects the mentality of ISR operators, but sustenance of this "always in the fight" attitude for extended periods may have undesirable psychological repercussions.

The US Army commissions an annual report detailing stressful incidents that affect Soldiers' mental health. Studies assessing data from 2007 through 2009 identified multiple deployments as a major contributing factor to mental problems among Army personnel.²² ISR operators, who are "always on," may possibly face *some* of the same concerns as individuals who deploy multiple times, but no data details the short- and long-term mental health issues associated with DCGS operations. Thus, commanders may someday confront a festering problem that could adversely affect their ISR operators.

Clearly, those commanders should invest in a study similar to the Army's to gauge the likelihood of mental health issues among persons who conduct combat operations from their home station. Such a study should address ISR operations, but commanders might consider expanding it to include other individuals, such as space and missile personnel who conduct distributed operations. It should also deal with ISR operators who spend several years conducting uninterrupted combat and non-combat missions. The findings might help identify potential mental health problems associated with DCGS operations—specifically, the attitudes and reactions of ISR operators to stressful situations in combat and noncombat environments. Regardless of the scope and scale of such a project, the Air Force should recognize mental health concerns as its operations increase in number and vary in scope.

Even without definitive data to document these matters, some commanders seek ways to assuage psychological stress. One initiative grants high-level security access to chaplains who support ISR operators in highly classified operating environments. Air Combat Command, which manages the pilot, sensor operator, and mission intelligence coordinator force, has taken similar



steps by granting clearances to mental health professionals, thereby expanding their access to assist operators in restricted duty areas. The side effects of including spiritual and mental health support personnel on or near operations floors remain unknown. Their presence could even inadvertently increase the pressure on task-saturated operators, who might view them as a distraction during time-critical moments. However, these initial steps will go a long way toward identifying and mitigating long-term stressors that affect people working in distributed operations, as have previous US Army research efforts in the forward operating environment.

Solving the personnel-related matters discussed above will not be enough to ensure that critical intelligence reaches the intended audience during humanitarian operations. Senior leaders must also address problems with the systems and processes that ISR operators rely upon to disseminate critical information. Declassifying sensitive information and identifying the associated delivery architecture during future humanitarian operations require planning to determine how best to deliver this information to operators who lack security clearances. Initially, security classification guidance and procedures for transmitting information to on-scene operators during Unified Response were convoluted.²³ For about the first week of operations, guidance changed repeatedly before it stabilized: virtually all electro-optical imagery was to be unclassified and transmitted through unclassified media.²⁴ Declassifying massive amounts of data and intelligence from remotely piloted ISR platforms so quickly was highly unorthodox, but personnel should expect it for future humanitarian operations. The situation in Haiti may have simplified the decision to declassify data and intelligence, yet guidance may differ considerably in case of humanitarian operations in more politically sensitive locations.

Releasing unclassified images may not prove feasible when the United States con-

siders assisting states like China, Russia, or Syria. Despite their likely apprehension about the United States flying traditional “spy” aircraft over their territory, such countries might permit overflights of ISR aircraft in case of a severe disaster, but the United States might follow more restrictive rules for imagery declassification and architecture than it did in Haiti. The broader implication is that combatant commands must establish uniform declassification standards and processes that provide for the release of large amounts of intelligence within hours or minutes of collection. If a uniform declassification process is not feasible across combatant commands, then each command should establish criteria and procedures for releasing information according to its regional standards, possibly even detailing initial country-by-country declassification guidance that ISR operators can follow during disaster response. To prepare for future operations, we should clarify processes and enhance tools to deliver unclassified information to NGOs now.

Unclassified reporting standards for the DCGS may represent the most appropriate solution for future humanitarian operations since they would offer the architectural framework for delivering unclassified data. Although disseminating unclassified intelligence is not a traditional function of current ISR operators, members of the 13th Intelligence Squadron exploited ISR data during Unified Response and posted intelligence on classified and unclassified collaboration websites through the 480th ISR Wing.²⁵ On the unclassified network, many images appeared on USSOUTHCOM’s website—the All Partners Access Network—for quick distribution of information to NGOs. However, because all combatant commands do not share this standard, decision makers should consider issuing blanket guidance for the unclassified distribution of intelligence in order to give ISR operators direction for filling requests from uncleared partners during disaster responses.

The Next Unified Response

Consider what might happen in the near future if we implemented the recommendations discussed above and then faced a hypothetical tsunami in Indonesia, comparable to the one that struck there in 2004. Suppose that the Indonesian government rejected a US offer of military forces to assist with initial recovery yet granted overflight permission for ISR aircraft. The United States could then provide assistance, largely unbeknownst to the local populace. The RQ-4 could immediately deploy from its forward station in Guam to supply nearly uninterrupted imagery coverage for humanitarian operations.²⁶ Additionally, tactical RPAs such as the Shadow and Raven could employ their sensors to investigate situations requiring further scrutiny of RQ-4 imagery. If these and other tactical RPAs—potentially numbering in the hundreds—linked into the DCGS, an unprecedented amount of data would stream to analysts around the world. Personnel could promptly send data garnered from these ISR platforms to our Indonesian partners and supporting NGOs via unclassified, or possibly classified, means.

In this scenario, the United States could show solidarity with its Indonesian partners, fostering a deeper friendship with an increasingly important international player—home of the world's largest Muslim population. We would expect surge operations to occur during execution of such a humanitarian mission. Nevertheless, the ISR mission would remain effective since (1) ISR personnel would not receive taskings beyond what resources allow, (2) we would have a better understanding of how increased operations affect their psycho-

logical health, and (3) we would have issued clear guidance for ISR support to recovery and relief workers well in advance of the operation. These factors would culminate in a response even more effective than our efforts following the 2004 tsunami in Indonesia or the 2010 earthquake in Haiti. Moreover, the Indonesian situation is another example of using remotely piloted ISR platforms to secure US national interests in operations other than war.

Future humanitarian operations may temporarily take precedence over combat operations, and a variety of challenges will likely accompany this new reality. As they address concerns about limited data processing capacity, psychological effects associated with high operations tempo, and procedures for declassifying intelligence, decision makers and ISR operators should also recognize the benefits of humanitarian ISR operations. If Haiti is any indication of the United States' ability to respond quickly, efficiently, and effectively to international disasters, US policy makers have yet another tool with which to advance our national interests. Moreover, leveraging remotely piloted ISR weapons of war in a socially constructive manner will pay dividends well beyond the initial intent of the weapons' design. By means of this new paradigm, the DCGS and other portions of the ISR community have demonstrated their ability and willingness to transition from a purely combat focus. Because ISR operators will probably improve upon the lessons of Operation Unified Response, future humanitarian efforts will become even more effective. ☛

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Notes

1. "Intelligence assets monitor foreign states, volatile regions, and transnational issues to identify threats to US interests in time for senior military leaders to respond effectively." Joint Publication 2-0, *Joint Intelligence*, 22 June 2007, I-23-24, http://www.dtic.mil/doctrine/new_pubs/jp2_0.pdf.
2. "Magnitude 7.0—Haiti Region," US Geological Survey, 12 January 2010, accessed 5 February 2010, <http://earthquake.usgs.gov/earthquakes/eqinthenews/2010/us2010rja6/#summary>.
3. US Southern Command, "Narrative History of Operation Unified Response," 25 May 2010, <http://www.southcom.mil/AppsSC/factFilesLarge.php?id=138>.
4. The Air Force's ISR assets deployed in the aftermath of Hurricane Katrina, marking the first time they were "collectively called to domestic contingency service to provide imagery and full-motion video to military decision-makers and on-scene response providers." Maj Kevin L. Buddelmeyer, "Military First Response: Lessons Learned from Hurricane Katrina," research report (Maxwell AFB, AL: Air Command and Staff College, 2007), 3-4.
5. Jesse Lee, "Thoughts and Prayers for Haiti," White House Blog, 12 January 2010, <http://www.whitehouse.gov/blog/2010/01/12/thoughts-and-prayers-haiti>. USCENCOM maintained its normal complement of ISR assets in-theater; however, the expected replacement RQ-4 was delayed due to operations in Haiti. Additionally, two RQ-1 orbits were dedicated to relief operations in Haiti. See Sharon Weinberg, "Military Drone Diverted from Mideast to Haiti," AOL News, 15 January 2010, <http://www.aolnews.com/world/article/military-drone-diverted-from-mideast-to-haiti/19318294>; and Judith Snyderman, "'Global Hawk' Photographs Damage to Help Relief Effort," American Forces Press Service, 15 January 2010, accessed 12 July 2010, <http://www.defense.gov/news/newsarticle.aspx?id=57540>.
6. "We cannot expect the Marines to swoop in with MREs [meals, ready to eat] every time a storm hits. We train soldiers to fight wars. You can't kill a storm." House, Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, *A Failure of Initiative: Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina* (Washington, DC: Government Printing Office, 2006), 15, <http://www.gpoaccess.gov/serialset/creports/pdf/hr109-377/overview.pdf>.
7. Col Floresita C. Quarto, "U.S. Military/NGO Interface: A Vital Link to Successful Humanitarian Intervention," US Army War College Strategy Research Project (Carlisle Barracks, PA: US Army War College, 18 March 2005), 4, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA433681&Location=U2&doc=GetTRDoc.pdf>.
8. Distributed ISR operations leverage mission management and analytical capabilities by physically separating the personnel who perform those duties from the ISR asset during mission execution. By their design, all RPAs and their ISR operators conduct distributed ISR operations.
9. See Col Keith W. Balts, "Satellites and Remotely Piloted Aircraft: Two Remotely Operated Ships Passing in the Fight," *Air and Space Power Journal* 24, no. 3 (Fall 2010): 35-41.
10. Robert M. Gates, *Quadrennial Defense Review Report* (Washington, DC: Department of Defense, February 2010), xvii, http://www.defense.gov/qdr/images/QDR_as_of_12Feb10_1000.pdf; John A. Tirpak, "The RPA Boom," *Air Force Magazine* 93, no. 8 (August 2010): 36-42, <http://www.airforce-magazine.com/MagazineArchive/Documents/2010/August%202010/0810RPA.pdf>; and Christopher Drew, "Drones Are Weapons of Choice in Fighting Qaeda," *New York Times*, 16 March 2009, accessed 12 July 2010, http://www.nytimes.com/2009/03/17/business/17uav.html?_r=1&hp.
11. House, "Intelligence, Surveillance and Reconnaissance: Overarching Guidance Is Needed to Advance Information Sharing," Statement of Davi M. D'Agostino, Director, Defense Capabilities and Management, Testimony before the Subcommittees on Air and Land Forces and Seapower and Expeditionary Forces, Committee on Armed Services, House of Representatives, 111th Cong., 2nd sess., 17 March 2010, 5, <http://www.gao.gov/new.items/d10500t.pdf>.
12. Jim Hodges, "The Get-Well Intel Plan," *C4ISR Journal*, 1 January 2010, <http://www.c4isrjournal.com/story.php?F=4411944>.
13. "Air Force Distributed Common Ground System," fact sheet, *Air Force Link*, 31 August 2009, accessed 5 August 2010, <http://www.af.mil/information/factsheets/factsheet.asp?id=15433>.
14. TSgt Matthew McGovern, "ISR Wing Members Contribute to the Fight," *Air Force Link*, 18 March 2010, accessed 12 July 2010, <http://www.af.mil/news/story.asp?id=123195175>; and MSgt Dale Yates, "480th ISR Wing Airmen Aid Haiti Recovery," *Air Force Link*, 8 February 2010, accessed 12 July 2010, <http://www.af.mil/news/story.asp?id=123189385>.
15. House, "Intelligence, Surveillance and Reconnaissance," 6.
16. Ibid.
17. An analyst uses data—the raw information garnered from ISR assets—to produce intelligence.

18. Although the operations in Haiti did not adversely affect the overall capacity of the DCGS, it does not have unlimited capability. Commanders, however, can augment capacity through extended work hours and work weeks for DCGS personnel—a process known as “surging.”

19. *C4ISR Journal* 8, no. 9 (October 2009), accessed 12 July 2010, <http://www.c4isrjournal.com/story.php?F=4251691>; and Barry Rosenberg, “Moving at the ‘Speed of War’ Is Air Force ISR Unit’s Goal,” *Defense Systems*, 5 April 2010, accessed 11 July 2010, <http://www.defensesystems.com/Articles/2010/04/06/Interview-Maj-Gen-Bradley-Heithold-ISR-Agency.aspx>.

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21. House, “Intelligence, Surveillance and Reconnaissance,” 7.

22. Judith A. Lyons, “Commentary on MHAT-IV: Struggling to Reduce the Psychological Impact of War,” *Traumatology* 13, no. 4 (December 2007): 40–45; Jerry Harben, “Army Releases Mental Health Advi-

sory Team V Report,” *Army Medicine*, 6 March 2008, <http://www.armymedicine.army.mil/news/releases/20080306mhatv.cfm>; and Jerry Harben, “Mental Health Advisory Team VI,” *Army Medicine*, 13 November 2009, <http://www.armymedicine.army.mil/news/releases/20091113mhatvi.cfm>.

23. In this context, classification means distinguishing between data too sensitive to release to the general public and data not sensitive enough to warrant withholding from the general public.

24. Although electro-optical images—similar to those produced by regular handheld cameras—were unclassified and released, other images (infrared and synthetic aperture radar) were not released.

25. Unclassified information was posted to USSOUTHCOM’s NGO collaboration website—All Partners Access Network—a “community of communities” that combines the benefits of unstructured collaboration (wikis, blogs, forums) and structured collaboration (file sharing, calendars) with the personalization of social networking to facilitate unclassified sharing with multinational partners and NGOs, as well as among various US federal and state agencies.

26. White, “1st Global Hawk Lands in Guam.”

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Developing Flexible Command and Control of Airpower

Lt Col Jeffrey Hukill, USAF, Retired
Dr. Daniel R. Mortensen

Over the coming decades, the Air Force can expect to be involved in missions across the full spectrum of conflict. Increasingly complex security environments will require the service to provide not only forces—ready and able to deploy quickly around the globe—but also the command and control architecture for those forces and their operations. Without the proper command and control of Air Force capabilities, the achievement of national military objectives will suffer.

Although centralized control—a guiding principle for organizing, training, and equipping Air Force command and control—sounds straightforward, it is in fact very complex and often misunderstood. The Air Force has misapplied this primary tenet by creating organizational structures with centralized command and control of

airpower only at the combatant commander (CCDR) level. Although productive for major combat operations, this “one-size-fits-all” configuration runs contrary to fully effective command and control of Air Force capabilities across the spectrum of conflict.

History demonstrates that effectual command and control of airpower requires flexible control, centralized at the appropriate level of command. The current centralized practice works well for operations led at the CCDR level but limits the Air Force’s ability to respond (other than through ad hoc means) to situations requiring decision authority below this level. The Air Force must adjust its



current organizational structures to create flexible command and control options that place decision authority at the appropriate level of command in order to prepare for the complex operating environment of the future. This adjustment will better prepare the Air Force to respond to situations across the range of military operations.

Historical Context

Command and control encompasses the way the Air Force organizes, commands, plans, controls, and executes capabilities to attain a joint force commander's objectives.¹ Historically, the most basic issue of command and control involved determining the best way to organize in order to concentrate the effects of airpower. Although the decentralization of air operations for tactical applications such as artillery spotting, observation, and reconnaissance proved useful in World War I, Gen John Pershing needed concentrated air forces for the massive Saint-Mihiel offense of 1918. Gen Billy Mitchell demonstrated the vital importance of centralization when he controlled over 1,500 aircraft necessary for all of the missions—reconnaissance, interdiction bombing, and fighter defense of the battlefield—associated with that successful battle.

In the early 1940s, Army air and ground planners understood the need to concentrate air resources to fight the powerful Axis air forces. The architects of America's first North African operation understood the centralized command of air resources. However, the vast distances separating the three amphibious assaults of November 1942, coupled with rudimentary communication capabilities, created issues with span of control.² These concerns prompted Twelfth Air Force to temporarily split its forces into three parts for operations in Morocco, Algeria, and Oran. Consequently, several Army ground commanders inferred that those air forces were allocated to the task force commands, so they attempted to direct them. The Battle of Kasserine Pass pro-

vided unequivocal evidence to all theater leaders of the need to assure that centralized command and control resided with Airmen. The British learned the same lesson when they fought Field Marshal Erwin Rommel in the Western Desert. After Kasserine, Allied leaders centralized both American and Allied air forces into one combined force.

Centralized command and control of these forces did not imply centralization at only one level of the Allied command structure. The vast multidivisional front in France established the need for clear centralized command and control *at the appropriate organizational level*. The most famous practitioner of this concept, Gen Elwood "Pete" Quesada, commanded all tactical air forces on the continent, some more directly than others. He answered to Ninth Air Force but controlled his own IX Tactical Air Command. His other tactical air commands included the XIX Tactical Air Command of Gen Otto "Opie" Weyland, who famously supported Gen George Patton's charge across central France. Quesada trained all levels of his command for the common purpose of supporting the ground team, and he continually ensured that his wing, group, and squadron leaders understood his command intent. He also worked closely with Lt Gen Courtney Hodges, commander of Army forces in France. Quesada saw to it that Hodges's subordinate ground forces understood the relationship and philosophy of a shared mission with Airmen, and Quesada's air forces operated flexibly to match the situation. They flew constant combat air patrols—a form of penny packets—over Patton's moving forces, yet Quesada could pull groups away from other support missions to offer concentrated air forces as necessary in coordination with the supported Army command.³

These command and control structures were designed to balance the proper degree of centralization with decentralization, seeking to preserve flexibility at the strategic and operational levels of war yet maintain tactical flexibility as well, thus helping

to increase the tempo of operations. Additionally, the Air Force needed command and control capabilities to support simultaneous global, theater, and subtheater operations. To balance these demands and sustain unity of command, unity of effort, and the proper span of control, the Air Force built structures that placed commanders who controlled elements of Air Force capability at various organizational levels.⁴

Since Operation Desert Storm, Airmen have settled on the idea that the proper command and control of Air Force capabilities must reside only at the CCDR level. After the successful Desert Storm campaign, the concept of the theater commander, Air Force forces/joint force air component commander (COMAFFOR/JFACC) became codified in joint and service doctrine.⁵ Desert Storm's theater COMAFFOR/JFACC model proved extremely effective in integrating airpower assets of other services in support of a single CCDR-led campaign. With the theater COMAFFOR/JFACC model in place and in the context of information technology's improving the ability to plan, organize, and control operations over long distances, along with personnel reductions due to budget constraints, the service continued to centralize its command and control structure at the CCDR level.⁶

Total centralization of Air Force command and control at the CCDR level formally began with the service's release of Program Action Directive (PAD) 06-09, *Implementation of the Chief of Staff of the Air Force Direction to Establish an Air Force Component Organization*, on 7 November 2006. This guidance for a redesign of the Air Force's operational command and control structure emphasized centralized control, placing centralized command and control of airpower at the CCDR level for execution by the theater COMAFFOR (normally also designated the JFACC). This concept works well for Air Force operations intended to produce operational and strategic effects.

Other situations, such as employing joint task forces (JTF) within a single theater, distributed ground operations, and tactical

operations, may work better with a more flexible command and control approach. Such an approach seeks to put decision authority and planning expertise at the appropriate level of command, not to give every Army company commander his or her own air assets. PAD 06-09 stipulates that in the event one theater CCDR establishes multiple JTFs, airpower control should remain with the theater COMAFFOR/JFACC at the CCDR level. To support the JTFs, the COMAFFOR/JFACC may deploy air component coordination elements (ACCE) as liaisons to ensure proper airpower support.⁷ The ACCE construct represents an effective solution for situations not requiring command decisions. However, since ACCES are not commanders, they lack legal authority to command and control air forces. As liaisons, these elements are better defined by what they *are not* than by what they *are*. Specifically, ACCES will not perform strategy development, guidance, apportionment, targeting, development of targeting effects, assessment, planning, production and dissemination of air tasking orders, real-time execution, or command and control of air and space operations.⁸ (Since the publication of PAD 06-09, joint doctrine has renamed the term to joint air component coordination element [JACCE].)

With the implementation of PAD 06-09 and subsequent directives, the Air Force lost its command and control flexibility across the range of military operations. It built a structure in which command and control of airpower resides with the theater COMAFFOR/JFACC at the CCDR level. This model effectively plans and executes global and theater missions; however, it may enjoy less success when span of control and tactical flexibility become concerns. The Air Force is not organized, trained, or equipped to provide command and control elements to command levels below the CCDR except to a few select sub-unified commands, other than through ad hoc means. Doctrine, as well as current and future real-world operations, demands alternative command arrangements.

Current Operations Hint at Future Challenges

The theater COMAFFOR/JFACC model worked well in the major combat phases of Operations Enduring Freedom and Iraqi Freedom, with overall theater operations under close direction of the CCCR. However, as air operations evolved into other missions across the range of military operations, seams developed that hindered the integration of airpower into the component and supported commands. These seams arose due to the lack of Airmen with command authority at the JTF level, a less-than-full range of Air Force planning expertise below the theater COMAFFOR/JFACC level, and the absence of Air Force representation on JTF staffs.⁹

Not all future operations will resemble the current ones in Afghanistan and Iraq, but certain attributes are likely to characterize them, such as continuous, simultaneous combinations of offensive, defensive, and stability or civil-support operations conducted in a highly integrated, networked, and distributed environment under the control of a JTF. Effective operations in this environment may call for the presence of commanders empowered with decision-making authority at lower organizational levels—individuals who can provide optimal span of control, unity of command, and tactical flexibility. Although Air Force and joint doctrine describe the possibility of creating these lower-level command structures, the Air Force has chosen to organize, train, and equip itself for only one model—the theater COMAFFOR/JFACC model with JACCE support at the subtheater or staff level.

Recommendations

The Air Force must create flexible command and control structures to meet the needs of the current and future operating environment. It should prepare for the entire range of military operations by retaining centralized control of appropriate capa-

bilities at the theater COMAFFOR/JFACC level while balancing the demands of working in an operational environment that requires decision making and planning expertise at lower organizational levels. Although the Air Force has the first piece of the puzzle—the theater COMAFFOR/JFACC model—it still needs to create capability for the rest by developing doctrine to help decide the appropriate time to deliver Air Force command and control below the CCCR level and then organize, train, and equip its forces to meet this need.

Determining When to Be Flexible

Ascertaining the organizational level for effective command and control of airpower is no simple task. It is as much an art as a science. Constant tension exists between joint force command elements during the process of determining the degree of centralized control of airpower. One must understand the appropriate time to use concepts such as the JACCE rather than another command-relationship construct or a combination of concepts. In his paper *Centralized Control and Decentralized Execution*, Col Clint Hinote identifies a practical way of identifying proper Air Force command architectures based on experiences from World War I to current operations. He poses five questions that offer direction for balancing centralization of the command and control of airpower.

What Is the Nature of the Operation?

A careful assessment of the military situation is critical when determining the appropriate degree of centralization. Different scenarios will drive different balances. For example, a campaign employing strategic attack as a line of operation will require a high degree of centralization under an air commander. The air commander must have the authority to direct operations, including attack sequencing, and shift them as operations unfold. In contrast, tactical air operations in direct support of ground commanders, such as close air support [CAS] and armed overwatch, are more effective when conducted with a high degree of decentralization. While the air command-

ers need to reserve the authority to shift assets [based upon joint force commander priorities], it is usually best for airpower to be allocated and distributed through tactical command and control nodes such as the ASOC [air support operations center] and then allow airmen to work directly with the ground commander to preserve tactical responsiveness. Furthermore, missions such as interdiction and counterair require a mix of centralization and decentralization, as centralized direction at the operational level of war is necessary to direct the overall priorities and weights of effort, but decentralized execution at the tactical level allows for a faster tempo of operations.

Where Should Flexibility Be Preserved?

A command and control structure designed to ensure flexibility at the operational and strategic levels of war almost always requires restrictions at the tactical level, and the opposite is true as well. It is important, therefore, that commanders decide the appropriate level to preserve flexibility. Nuclear operations, for example, are highly centralized—for good reason. They are designed to give the president flexibility at the strategic level, so they are highly restricted at the tactical level. Conversely, counterinsurgency operations tend to be highly decentralized, ensuring flexibility for the tactical commanders to increase legitimacy and influence within the population. Other military missions tend to fall somewhere between these two extremes. . . .

How Many Assets Are Available?

Simply stated, if plenty of assets are available, air operations can be highly decentralized with a low risk of dilution. Unfortunately, this is almost never the case, because air assets are usually limited, and their capabilities are highly desired by the joint force. Fewer assets drive the need for more centralization. . . .

What Is the Geographical Range of Effects?

Another key factor is the geographical range of airpower. Few benefits [accrue] to centralizing command and control of assets with a limited range, such as some rotary-wing and unmanned systems, as it is difficult to shift them to other missions. Once the initial allocation decision is made, it is usually best to

allow these to be decentralized. A great benefit, however, exists in centralizing control over assets that can range over a theater or more. . . .

Who Has the Best Situational Awareness?

. . . The JFACC's command and control system, also called the tactical air control system (TACS), must be flexible. In certain stages and phases, the TACS must be highly centralized, with the AOC [air and space operations center] taking the lead in many activities. In other phases, especially during irregular warfare and stability operations, a highly decentralized TACS is more likely to be effective, and such subordinate elements of the TACS as the ASOC will have a large role to play. At all times, the JFACC maintains the ability to adjust operations if the strategic/operational environment changes. The art of airpower command and control is finding the right balance between centralization and decentralization in light of the specific situation.¹⁰

In addition to considering Colonel Hignite's questions, commanders should determine if trust has been established between joint and service commanders. If so, trust between the theater COMAFFOR/JFACC and the JTF commander will facilitate the decision to place an Air Force commander below the theater level. Creating truly joint JTF staffs will help establish trust. Additionally, these individuals should not use technological (i.e., virtual) means as the primary method for creating personal relationships. Granted, communication technology can connect theater commanders with lower joint and service organizational levels, but it is not the preferred solution for establishing trust among commanders. To quote an often-used observation, "Virtual presence is actual absence." Developing a commander's trust demands "actual presence." Teamwork and trust are best built through personal contact and shared experiences—not solely through the use of video teleconferencing. Just as personnel must understand the national culture when they conduct operations, so must they understand the culture of the services that need air, space, and cyberspace effects. The culture of the ser-

vices that Airmen work with daily—the Marine Corps and the Army—thrives on personal relationships. Technology must support the command and control of airpower but not replace the presence of commanders and planning expertise at the appropriate planning levels. Sometimes presence alone obtains the desired effect.

Finally, leaders should consider the following, additional questions as they seek to formulate command and control arrangements below the CCDR level. First, does the more pressing operational need exist at the subtheater or theater level? Second, does the need for Air Force capability require forces to operate (swing) theaterwide? Third, is the subtheater air command and control requirement an AOC and AFFOR staff element or a tailored one? Fourth, is the desired command and control even available? Finally, if the situation calls for a command and control element below the CCDR level, would operational or tactical control be more appropriate?¹¹

Choosing among Options for Organizing, Training, and Equipping

If answers to all of the preceding questions lead a commander to establish an Air Force command element below the CCDR level, then the service must create a formal organizational structure within which to place the required command and control expertise. This organization should promote effective integration and synchronization of Air Force capabilities with the joint mission, including aligning forces and establishing command authority along with planning expertise at the appropriate organizational level. Joint doctrine calls for this capability, and the Air Force needs to organize, train, and equip to support that option. Expectations regarding future defense budgets suggest that the Air Force will likely find itself unable to fully staff and equip an AOC to support every JTF. With this constraint in mind, the service needs to address the challenge of organizing, training, and equipping

appropriate command and control forces below the CCDR level along two tracks.

Track One: Presenting Command and Control Elements to the Subtheater

Level. The first track involves either attaching these forces to the subtheater-level JTF or organizing them to support the JTF directly.¹² If the combatant commander decides to attach forces, such as an air and space expeditionary task force (AETF), to a JTF, then the AETF commander would be designated as the COMAFFOR for those assigned forces and could be designated as the JFACC (fig. 1). If the JTF already has a JACCE assigned, then the JACCE can be dual hatted as the COMAFFOR, retained as a separate position, or eliminated. The AETF can leverage distributed operations through reachback to the theater AOC and AFFOR staff. However, the tailored AETF command and control capability must provide the AETF commander who serves as the JTF COMAFFOR/JFACC enough capability to employ Air Force forces in accordance with the JTF commander's orders as well as the ability to prepare and sustain forces to carry out those orders.

Unity of command and effort for attached Air Force forces will reside at the JTF level. Command of global and theater forces not attached to the JTF but supporting it will remain at the theater COMAFFOR/JFACC level. This arrangement allows for unity of command and effort of forces that routinely swing throughout the theater and around the globe. Moreover, the CCDR has the authority to reassign forces attached to a JTF to address higher theater priorities.

Personnel currently used only on the JACCE staff can support the JTF COMAFFOR/JFACC after establishment of the task force. The personnel system must identify those individuals who have performed JACCE staff duties to facilitate their assignment to a newly established JTF or their replacement of already deployed personnel during extended operations. These members should possess the expertise to apply the full range of Air Force capabilities to support a potential JTF. Whether they perform

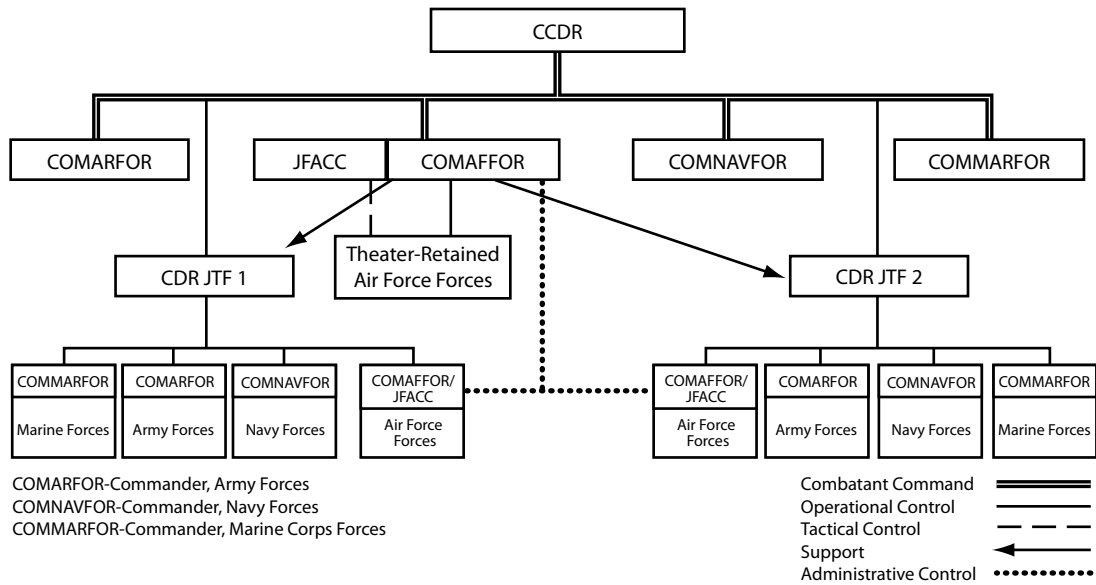


Figure 1. Air Force forces attached to a joint task force. (Adapted from diagrams developed at the Curtis E. LeMay Center for Doctrine Development and Education, Maxwell AFB, Alabama.)

strictly JACCE or JTF COMAFFOR/JFACC duties, such personnel must receive qualification and currency training for credibility and readiness upon creation of the JTF. The use of unit type codes will permit the building of subtheater JACCE/COMAFFOR modules beforehand to further expedite deployment of qualified personnel.

If, however, the CDRR decides not to attach forces to an established JTF, an appropriately sized expeditionary unit composed of all Air Force forces physically present within the JTF's joint operating area can be designated to directly support the commander (fig. 2).¹³ Since the forces are essentially dedicated to the JTF commander under a single Air Force commander, this construct offers unity of effort at the JTF level. Unlike the situation when forces are attached to the JTF, the COMAFFOR retains operational control, creating unity of command at the CDRR level. This arrangement allows the COMAFFOR to retain the authority and flexibility to shift those forces in response to the CDRR's direction without first

having to regain control from the JTF commander. However, this idea does necessitate creation of an organizational construct for the new intermediate expeditionary unit.¹⁴ At present, no established Air Force echelon of command for a multiwing expeditionary unit exists below the level of the numbered Air Force. Historically, the *air division* represents the correct designation, and resurrection of this concept as a provisional unit denotation for expeditionary operations would prove quite useful. An expeditionary air division in direct support of a JTF commander would provide unity of effort at the JTF level yet retain unity of command and effort at the CDRR level.

Track Two: Subtheater-Level Planning Integration Challenges.

The successful command and control of joint forces depends upon the effective integration of operational planning processes. As it has done with command authority, the Air Force has excessively centralized its planning expertise at the operational level of war.¹⁵ Centralization of planning at the theater COMAFFOR/

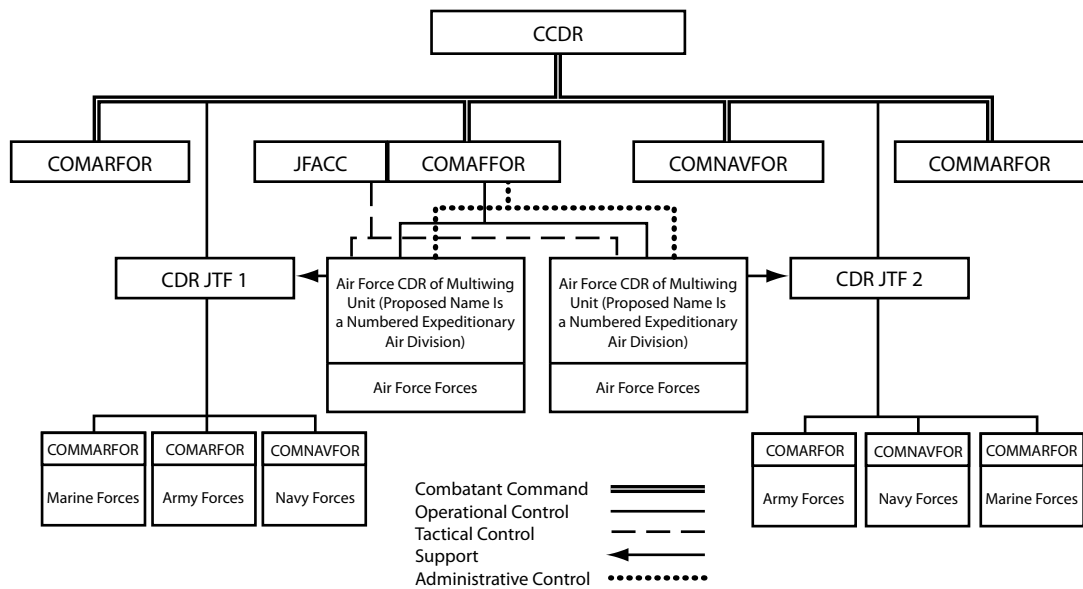


Figure 2. Air Force forces in direct support of a joint task force. (Adapted from diagrams developed at the Curtis E. LeMay Center for Doctrine Development and Education, Maxwell AFB, Alabama.)

JFACC level is fine for traditional major combat operations but less appropriate for missions in noncontiguous areas of operation in which ground units must conduct planning at the tactical level to encourage small-unit initiative.¹⁶ Distributed planning consists of placing the correct expertise and appropriate planning tools at locations where operational plans are born and refined.

Air Force units known as tactical air control parties (TACP) align at various organizational levels with Army units to integrate CAS. These organizations provide ready structures to place a broader range of Air Force planning expertise, improving planning integration. The Air Force must permanently assign experienced planners with air planning, electronic warfare, intelligence, space, airlift, and cyber expertise to these units rather than rely on taking people from the service at large through the air and space expeditionary force process. These more robust TACPs could be supplemented with additional personnel through

that process, but the core cadre should consist of permanently assigned trained professionals. This permanent structure would replace today's ad hoc TACP organization that supports the noncontiguous fights in Iraq and Afghanistan.

Although staffing these modified TACPs can prove difficult because of budget constraints, the Air Force could, for example, push planners out from AOCs. The fact that more of the planning now occurs at lower levels reduces the number of personnel needed within these centers. The Air Force should handle this available pool in two ways. First, it should designate some AOC slots for JTF JACCE/COMAFFOR/JFACC support. Individuals identified for JTF-level duties and assigned to these slots would work daily in an AOC but could move to a JTF should the need arise. Second, it could transfer the remaining slots to the modified TACPs, using them as a career-broadening opportunity for personnel assigned to the AOC.

Finally, despite tight budgets, the Air Force might consider investing in additional resources to develop command and control and planning expertise. In 2006 the Air Force faced a similar choice. The Army's reorganization and the distributed nature of irregular warfare in Iraq and Afghanistan prompted a greater need for joint terminal attack controllers. Regardless of substantial personnel cuts, the Air Force deemed the CAS mission so critical that it increased the controller career field by approximately 900 people. The service may face this same dilemma unless it can gain enough manning by pushing planners out from the AOC. To ensure the proper integration and synchronization of air, space, and cyberspace power, the Air Force may have to make distributed planning resources a priority despite restrictive budgets.

Conclusion

Command and control systems have tied together ground and air forces for nearly 100 years. Tensions between air and ground leaders have equally deep historical roots, reflected in the command element which ensures that leaders can adequately direct their forces and in the control or communications equipment that permits a workable intersection among commanders of both ground and

air forces. Commanders have made countless adjustments to the command and control system over the years, and it appears that another adjustment is necessary.

The emerging environment and nature of modern military operations will become increasingly joint, coalition, distributed, complex, intense, and global. These changed conditions demand flexible command and control of airpower with appropriate decision authority at the correct level of command. In particular, Airmen are discussing how best to provide an effective subtheater command and control system. The current system relies upon the master tenet of centralized control—one that can take advantage of the unique characteristics of modern airpower, including speed, range, and multi-dimensional operations. The complexity of operating across the full range of military operations calls for a review of how the Air Force applies this concept today. The service must prepare to command its air resources at the global, theater, and even sub-theater levels.

The Air Force is well prepared at the first two levels. Now, as the idea of subtheater command and control becomes truly viable, it must conduct an overarching study, develop a concept of operations, organize forces, train new commanders, and identify equipment necessary to control units at this lower level. ☛

Notes

1. Grasping the issues concerning command and control depends upon an understanding of the following definitions. One joint publication defines *command and control* as "the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission." Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April

2001 (as amended through 30 September 2010), 84, http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf. Two other documents apply this definition to a joint force as follows. The authority to direct joint operations proceeds through the designation of a joint force commander (JFC), a general term applied to three levels of command: a CCDR, a subunified commander, or a joint task force (JTF) commander. A JFC exercises command and control of airpower through service commanders, functional commanders, or joint staffs. If service commanders exercise command and control, the designated commander of an Air Force service component assigned or attached to a JFC is called the commander of Air

Force forces (COMAFFOR). At the unified and sub-unified command levels, the COMAFFOR is the pre-designated Air Force service component commander. For example, the commander of Air Forces Central is a COMAFFOR at the unified command level, and the commander of Air Forces Korea is a COMAFFOR at the subunified level. A COMAFFOR can also be established at the JTF level when Air Force forces are assigned or attached to a JTF. Importantly, COMAFFORs at the unified and sub-unified levels are pre-designated, but at the JTF level a COMAFFOR is established only if Air Force forces are attached or assigned. If a JFC decides to use functional commanders, the COMAFFOR with his or her command and control capability should be prepared to assume responsibilities as the combined/joint force air component commander. Finally, a JFC could decide to plan, direct, and control joint air operations with the assistance of the JFC staff only. In this situation, the JFC would retain command authority and responsibility, normally requesting augmentation from appropriate components to perform the command and control air function as well as assist in planning and coordinating joint air operations. JP 3-30, *Command and Control for Joint Air Operations*, 12 January 2010, I-2–II-2, http://www.dtic.mil/doctrine/new_pubs/jp3_30.pdf; and Air Force Doctrine Document (AFDD) 2, *Operations and Organizations*, 3 April 2007, 35–42, <http://www.e-publishing.af.mil/shared/media/epubs/AFDD2.pdf>.

2. With regard to span of control, “The desired reach of the JFC’s authority and direction over assigned or attached forces will vary depending on the mission and the JFC’s ability to [command and control] the actions required. Span of control is based on many factors including the number of subordinates, number of activities, range of weapon systems, force capabilities, the size and complexity of the operational area, and the method used to control operations (centralized or decentralized).” JP 1, *Doctrine for the Armed Forces of the United States*, 2 May 2007 (incorporating change 1, 20 March 2009), IV-19, par. 14b, http://www.dtic.mil/doctrine/new_pubs/jp1.pdf.

3. Since World War II, the term *penny packets* has meant parceling out airpower to ground forces. The use of penny packets serves the individual ground commander, but it prevents air commanders from concentrating airpower to support important ground operations or to strike strategic targets.

4. “Unity of command is accomplished by establishing a joint force, assigning a mission, or objective(s) to the designated JFC, establishing command relationships, assigning and/or attaching appropriate forces to the joint force, and empowering the JFC with sufficient authority over the forces

to accomplish the assigned mission.” JP 1, *Doctrine for the Armed Forces of the United States*, II-3, par. 2c. Unity of effort is the “coordination and cooperation toward common objectives, even if the participants are not necessarily part of the same command or organization—the product of successful unified action.” JP 1-02, *Department of Defense Dictionary*, 489.

5. The JFACC is “the commander within a unified command, subordinate unified command, or joint task force responsible to the establishing commander for making recommendations on the proper employment of assigned, attached, and/or made available for tasking air forces [sic]; planning and coordinating air operations; or accomplishing such operational missions as may be assigned. The joint force air component commander is given the authority necessary to accomplish missions and tasks assigned by the establishing commander.” JP 1-02, *Department of Defense Dictionary*, 247. The COMAFFOR is “the senior US Air Force officer designated as commander of the US Air Force component assigned to a joint force commander (JFC) at the unified, subunified, and joint task force level. In this position, the COMAFFOR presents the single US Air Force voice to the JFC.” AFDD 2, *Operations and Organizations*, 150.

6. The Air Force eliminated some of its mobile command and control capability, including airborne command, control, and communications aircraft.

7. Headquarters USAF, Program Action Directive 06-09, *Implementation of the Chief of Staff of the Air Force Direction to Establish an Air Force Component Organization*, 7 November 2006, A-4, par. 7.4.

8. *Ibid.*, A-I-8, par. 5.8.6.2.

9. Office of Air Force Lessons Learned, *Focus Area: Air Force Innovations for the Joint Fight Role of the Air Component Coordination Element*, Lessons Learned Report (Washington, DC: Office of Air Force Lessons Learned, 22 June 2010). See also Office of Air Force Lessons Learned, *Integration of Airpower in Operational Level Planning*, Lessons Learned Report (Washington, DC: Office of Air Force Lessons Learned, 22 August 2008).

10. Lt Col Clint Hinote, *Centralized Control and Decentralized Execution: A Catchphrase in Crisis?*, Research Paper 2009-1 (Maxwell AFB, AL: Air Force Research Institute, March 2009), 59–64, http://aupress.au.af.mil/digital/pdf/paper/Hinote_centralized_control_and_decentralized_execution.pdf.

11. Doctrine Summit, Curtis E. LeMay Center for Doctrine Development and Education, Maxwell AFB, AL, October 2010, briefing slide no. 8.

12. Direct support is “a mission requiring a force to support another specific force and authorizing it to answer directly to the supported force’s request

for assistance.” JP 1-02, *Department of Defense Dictionary*, 138. The authors derived concepts in this discussion from multiple interviews at the Air Staff, major command, AFFOR, and component-numbered Air Force levels; the Curtis E. LeMay Center for Air Force Doctrine Development and Education; and a read-ahead paper entitled “Caging the USAF Presentation of Forces and C2 Requirements” (Doctrine Summit, October 2010).

13. The authors derived concepts in this discussion from multiple interviews at the Air Staff, major command, AFFOR, and component-numbered Air Force levels; the Curtis E. LeMay Center for Air Force Doctrine Development and Education; and a read-ahead paper entitled “Caging the USAF Presen-

tation of Forces and C2 Requirements” (Doctrine Summit, October 2010).

14. This construct is not an AETF since the latter is attached with specification of operational control to a JFC, which occurs when forces are attached to the JTF. AFDD 2, *Operations and Organization*, 43–44.

15. Office of Air Force Lessons Learned, *Integration of Airpower in Operational Level Planning*, uses that assessment as a recurring theme.

16. For discussion of planning during distributed land operations, see AFDD 2-3, *Irregular Warfare*, 1 August 2007, 66–68, <http://www.e-publishing.af.mil/shared/media/epubs/AFDD3-24.pdf>. See also Office of Air Force Lessons Learned, *Integration of Airpower in Operational Level Planning*, 6.



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Strategy and Airpower

Col John A. Warden III, USAF, Retired

When a new technology appears in business or war, advantages in cost or efficiency—albeit initially marginal—may be clear almost from its appearance. Conversely, decades or even centuries may pass before we conclude that the new technology is not a substitute for the old but offers the opportunity to move into a new dimension previously not available or even conceived. Such myopia often leads otherwise competent observers to underestimate significantly the new technology's potential. Two business examples stand out: in 1876 Western Union observed that “this ‘telephone’ has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us”; and in 1977 Ken Olsen de-

clared that “there is no reason for any individual to have a computer in his home.”¹

In the military sphere, airpower—anything guidable that moves through the air or space, manned or remotely piloted—has encountered the same problem, as evidenced by Marshal Ferdinand Foch's reported evaluation of the airplane when he was a professor of strategy at France's École supérieure de guerre (war college) before World War I: “Airplanes are interesting toys, but of no military value.”² Certainly, few people today would go as far as Marshal Foch in dismissing airpower as just a toy, but perhaps equally few understand that airpower can and should fundamentally change the very nature of war.



The first known combat employment of the airplane took place over Libya during the Italo-Turkish war of 1911, just a century ago.³ In the intervening years, range, speed, payload, and accuracy have improved substantially, and airpower has profoundly influenced the outcome of every conflict following its first major application in World War I. Despite its past successes, however, we still tend to see airpower as a means of improving or facilitating old ways of war rather than the path to revolutionary change of enormous value to the United States.

Regardless of airpower's potential, it can never realize its real capability so long as it remains bound to an anachronistic view of war with an anachronistic vocabulary. On the contrary, if airpower is truly to come of age, it must do so in the context of a modern concept of war that associates the use of force as directly as possible with end-game strategic objectives, not with the act of fighting. If this is to happen, the operators of airpower must understand, believe, and teach end-game strategy as the foundation of airpower. Failure to do so will condemn airpower to suboptimization and deprive its owners of using force in such a dramatically different way that will achieve national objectives quickly and at minimum cost. To succeed, airpower advocates must stop trying to use airpower as a substitute for its military predecessors, connect it directly to strategic end-games, adopt a new vocabulary to match airpower's promise, and become serious promoters not of machines but of ideas.

War seems part and parcel of the human condition although we have reasonable knowledge of details about wars only of the last several thousand years. Most of those occurred between opposing land forces, and the bulk of our thinking and writing has focused on the land aspect of conflict. Less has been written about sea power although it often played a crucial role in the outcome of conflicts dating back at least to the ancient Greeks. As evidence of what we might consider a fixation, consider Carl von Clausewitz's book *On War*, in which the role

of sea power in the defeat of Napoleon is conspicuous by its absence.

Land operations have so dominated the study of war that war itself has come to be defined almost exclusively as the clash of armies. The clashes, the battles, became not only the measure of success but also something to be desired. As Clausewitz said,

Combat is the only effective force in war; its aim is to destroy the enemy's forces as a means to a further end. . . . It follows that the destruction of the enemy's forces underlies all military actions; all plans are ultimately based on it, resting on it like an arch on its abutment. . . . The decision by arms is for all major and minor operations in war what cash payment is in commerce. . . .

Thus it is evident that destruction of the enemy forces is always the superior, more effective means, with which others cannot compete.⁴

Our purpose is not to critique Clausewitz (in many ways the *pontiff maximus* of Western armies for a century and a half) but to use him as a writer still much read and as an example of how most people, including heads of state and their senior officers, think about war. To them, war is inevitably the clash of arms—to repeat, “The destruction of the enemy's forces underlies all military actions. . . . That destruction of the enemy forces is always the superior, more effective means, with which others cannot compete.” It is amazing how this idea has remained so embedded in our thinking and culture, especially in light of a number of historical examples of wars either won or significantly influenced by some other means. Readers need no reminder that one of the world's truly great empires grew largely on the back of a Royal Navy that frequently won “wars”—or prevented them—by its mere presence.

Exponents of *On War* largely overlook the fact that even Clausewitz said that the “aim is to destroy the enemy's forces as a means to a further end.” Then, for a variety of reasons, he and his followers focused their thinking, writing, and fighting on fighting! And this is our problem: we only

give lip service to “the further end,” remaining fixated on an infatuation with battle.

So here is a proposition: let us resolve to expunge the words *fighting*, *battle*, *shape the battlefield*, *battlespace*, and *the war fighter* from our vocabulary, to relegate the “means” of war to the last thing we think about, and to elevate the “end” to the pedestal of our consideration. In other words, let’s bury thousands of years of bloody battle stories, as heroic as they were, and start looking at war—and eventually airpower—from its end point, which by definition means from a strategic perspective.

Strategy can be complex, but for our purposes we can simplify it considerably. At the most basic level, strategy addresses four words: Where, What, How, and Exit. These words serve as the foundation for the four strategic questions:

1. *Where* do we want to be in the future? In other words, what do we want ourselves and our opponent to look like at some specific point in the (postwar) future? For simplicity, we can call this a future picture.
2. *What* can we put our resources against that will create the conditions to allow us to realize the future we have just described? At the highest level of analysis, we start this process by identifying the systems that need to change so that we can realize our future picture; at the next level of analysis, we continue by identifying the centers of gravity (the control or leverage points) against which to apply real resources to force needed system change.⁵
3. *How* and in what time frame can we affect the things against which we are applying our resources? In this step, we will eventually make decisions about the tactics, but we will start with decisions about the time we can afford and the sequence of attacking centers of gravity within that time frame. We go out of our way not to choose our tac-

tics—a bomb, bullet, or torpedo—until we well understand everything else.

4. *Exit*. How do we move on, following success—or failure? Occasionally, endeavors as complex and dangerous as war lead to success for one of the antagonists. Moving on from success, however, is not easy, and we must think through it at least as carefully as we considered the decision on the future picture and the decision to go to war. Even more dangerous is the much more likely event of making significant mistakes along the way. Failure to have a plan for failure leads to a high probability of disaster.

Assuming that we can create a future picture for ourselves and our opponents, the two questions of direct relevance to our topic of airpower and strategy are the second (What?) and the third (How?), although we can certainly make a case that withdrawal (Exit) from an airpower war gone well (or badly) is much easier than from one in which ground power dominated. Seemingly, if we want anything (a future picture) different from that which currently exists, something must change to make it happen. In the geopolitical world, if we have a future picture (strategic objective) for an opponent (which may be a nation-state, group such as al-Qaeda, or tribe), that adversary must change in some way to reflect our future picture. Since the opponent probably doesn’t want to change, we need to do something to force it.

Opponents are complicated things with many moving and static parts, but we can simplify our analysis by seeing them as a system, which means that they function in some reasonably connected manner. Systems exist for a purpose—in this case, to do something (which may be little more than survive) that we don’t want them to do. To do something, the nation-state or group uses its internal components to realize the “something.”

If a state, for example, wanted to attack another state, it would go through steps similar to the following:

1. One or more individuals (*leaders* with or without portfolio) would espouse the idea, find other leaders to help them, or suppress those who opposed their idea.
2. It would develop or put into motion the *processes* necessary to garner support from more members of the state and to acquire resources such as arms and ammunition for the attack; put other processes into motion to recruit, train, and equip the forces needed for the attack; and nurture the processes necessary for survival of the state, such as communications, food production and distribution, financing, and manufacturing.
3. The state would ensure that the roads and other *infrastructure* were adequate for survival and for supporting attack operations.
4. It would take steps to ensure either adequate support from the *population* or to suppress opposition.
5. Finally, it would send some of its *fielded forces* (almost always a relatively small part of the population, at least since the days of the Mongols) to carry out the assigned attack.

Note that sending forces off to attack is the last step in the simplified process and that the state probably has the ability to send more forces if the initial batch runs into problems. A visual depiction of this organizational pattern helps us understand it (fig. 1).

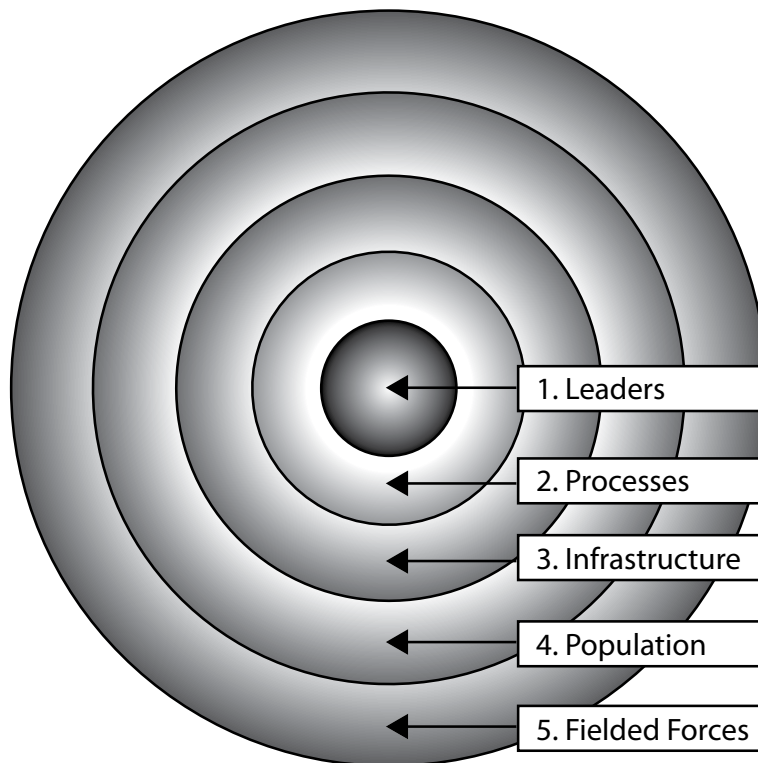


Figure 1. The enemy as a system—the five rings

Reversing the sequence just described (i.e., moving from the outside rings to those inside) reveals that the state could probably lose the entire force that it dispatched but, other things being equal, could nevertheless remain an entirely capable organization (recall the very rapid recoveries from British losses at Yorktown in 1781 and British and Commonwealth losses in Singapore in 1941).

Conversely, if the state's leaders were gone or had lost their interest in conflict, and if communication were limited, food production and distribution broken, and movement difficult to impossible, then the state (or group) could no longer function at its prior level—and, indeed, would be doomed over some period of time. Recall Germany and Japan in 1945. Despite suffering significant losses in their attack forces, quite large Japanese forces, in particular, were still fighting well at the time of surrender. This fact suggests that the opponent's armed forces (whether highly trained pilots or suicide-belt bombers) could hardly be the place to start thinking about attaining geopolitical objectives. In fact, it would seem the least appropriate place imaginable. Our thinking should always move from the inside rings to the outside ones, never from the outside to the inside.

If we see the enemy as a system, we first determine what the system needs to look like so that we can realize our future picture for it. At one extreme, Rome envisioned Carthage's disappearance at the end of the third Punic War, which necessitated the system's destruction. At the other end of the spectrum, during the first Gulf War, attaining the United States' major objective of regional stability meant that Iraq could not remain a strategic threat to its neighbors, which in turn meant weakening but not destroying Iraq as a system so that it could function and defend itself but not undertake new foreign adventures.

Once leaders choose the desired overall system effect, the next step is to find the centers of gravity whose alteration will create the desired system change as directly (strategically) as possible. We start with the

center ring and work from the inside to the outside to find the right centers of gravity. Note the following simplified examples:

1. *Leaders* (ring one). If a strong leader such as Attila, Napoleon, Bismarck, Hitler, or bin Laden is taking an opponent in a particular direction, the removal of that leader (and perhaps his close associates) will normally result either in a reversal of direction or significant deceleration. If we wanted such a change, removal or conversion of a leader (through force, persuasion, or even bribery) would constitute a direct strategic action since change in the center of gravity is directly associated with a strategic objective.
2. *Processes* (ring two). If an opponent refuses to agree to desired terms, we can put it into a position that makes impossible any pursuit of objectives that conflict with our future picture. In World War I, the Allies imposed a blockade on Germany's food-distribution process that B. H. Liddell Hart considered "fundamental" to the outcome of the war; more directly, continuation of the blockade into 1919 forced the postwar German government to accept the harsh terms of the Treaty of Versailles.⁶ Germany could not survive in the face of a blockade that produced a direct strategic effect.
3. *Infrastructure* (ring three). A nation-state or a group needs some amount of infrastructure to function. It may belong to someone else, but even in today's world we need to put our feet down someplace in order to conduct business. In the current Afghanistan war, we produced the important and early effect of depriving al-Qaeda of infrastructure that had served it well as a base of operations and for training and indoctrination camps. This loss did not destroy al-Qaeda, but it did severely complicate its ability to do business. This is an example of an-

other center of gravity closely linked to a needed strategic effect although, by itself, it did not reduce al-Qaeda to a manageable level.

4. *Population* (ring four). Nation-states and groups need elements of the population (demographic groups) to be sympathetic and helpful in a variety of ways. In the Malayan Emergency, the United Kingdom isolated the ethnic Chinese, who represented the heart of the problem, thus making the situation manageable.⁷ Here, a focus on the population center of gravity helped lead to direct strategic results—the end of the emergency.
5. *Fielded Forces* (ring five). If we follow Clausewitz, we see enemy fielded forces (the enemy military) as the focus of our efforts—something to engage and defeat in battle. And that is how we have traditionally dealt with them. When a nation-state or a group loses some part of its fielded forces, it does one of three things in order of

likelihood: organize and send more; negotiate to buy time to send more or hope for something good to happen; or agree to proffered peace terms when the terms look more attractive than continuing to fight. Note that the choice is up to the opponent and that the choice is unpredictable. In only a few circumstances does changing the fielded-force center of gravity produce direct strategic results. Affecting fielded forces is usually a difficult means to a murky and distant end.

A little thought will suggest that the centers of gravity in the five rings do not all have the same value in terms of their return on the investment needed to affect them. Normally we realize a far higher return on investments (whether bombs, bullets, or bullion) to affect the inner rings than on those to affect the outer rings (fig. 2). This does not mean that we can or should always ignore the outer rings; it does mean, however, that we can expect the cost of dealing with the outer rings to be quite high in comparison to the return on the operation.

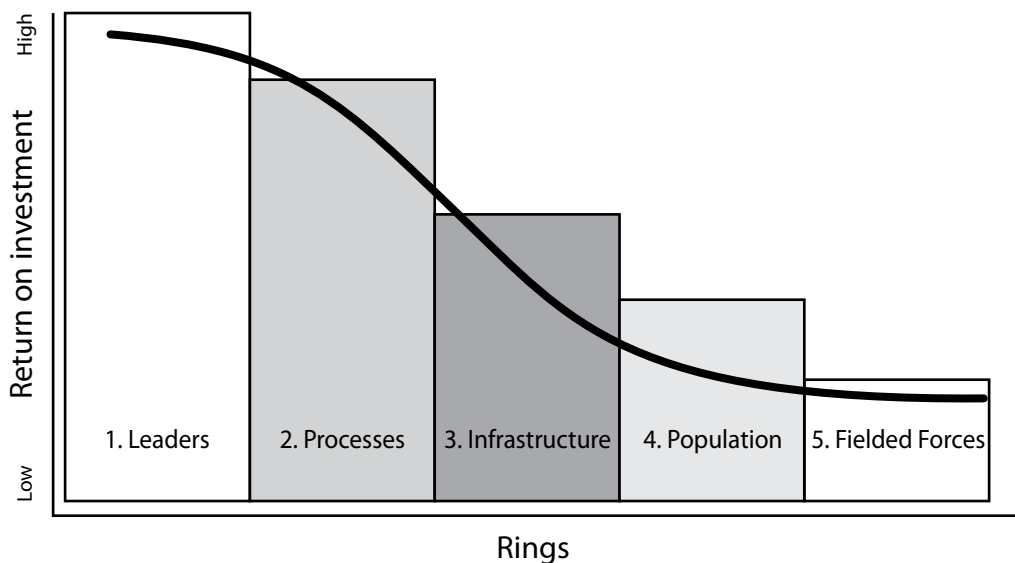


Figure 2. Return on investment for efforts to affect different rings

In the strategy methodology just discussed, we first identify our strategic objectives, our “where”—the future picture for the opponent. (We really need to do it first for ourselves, but that is another subject.) Then, looking at our opponent as a system, we find the centers of gravity that, when affected, will have the most direct effect on realizing our strategic objectives. In a few cases, we may find that just one or two will prove adequate, but in most instances we must affect several in a relatively compressed period of time. Notably, even in a large system such as the United States or China, the number of targets associated with strategic centers of gravity is rather small—considerably fewer than 1,000, more than likely.

If we need to address the opponent's fielded forces at all, we can and should use exactly the same methodology that we used at the strategic level. After identifying our objective, which could range from destruction through immobilization to recruitment, we analyze the fielded force as a system and find the relevant centers of gravity, starting from the center. The number of centers of gravity with which we have to deal in this case will normally translate into far fewer targets than if we took the traditional approach of a war of attrition against the force's personnel and equipment. The number of targets associated with operational-level centers of gravity for even a large fielded force is again surprisingly small—probably in the low thousands at most (e.g., the Iraqi army in Kuwait in 1991).

After identifying the centers of gravity, we decide what they must become (destroyed, isolated, converted, paralyzed, etc.) and how we will measure success. Only at the very end do we decide the methodology (the tactics) that we will employ to affect them. Note that if we start with the last step—choose a tactic such as a ground attack—we subvert the whole strategy process and will probably do nothing that makes sense, let alone do the best thing. The strategic approach gives us the freedom to consider and mix every conceivable way to

change a center of gravity—a bribe, an aerial bomb, a hack, a proxy, a conference, an award, assistance funding, or a thousand other possibilities. Rather interestingly, a ground attack against an army would be one of the last things put on the list.

If we end up choosing to use force as a major or complementary way to achieve strategic objectives, the methodology just described (or something similar to it) is crucial to the effective exploitation of airpower. This methodology allows us to select the most appropriate centers of gravity and then apply airpower (if appropriate) to produce direct strategic results. It helps us avoid the siren lure of “battle” and prevents us from starting with the “means” à la Clausewitz, while giving only a nod to “other ends” and really having no clear idea exactly where the “means” will lead. To the extent that national leaders understand this methodology, they understand the value of airpower; to the extent that they don't, they will not understand and will become victims of thousands of years of tactical history that has lost much of its relevance. Another critical and generally ignored component of strategy, however, accentuates even more the importance of airpower—and that is time itself.

Leaders of any competitive enterprise, including leaders of a nation (or any other group), must understand the importance of time, for it is a critical yet normally mismanaged element. As Sun Tzu said two millennia ago, “Thus, though we have heard of stupid haste in war, cleverness has never been seen associated with long delays. . . . There is no instance of a country having benefited from prolonged warfare.”⁸ This statement is as true today as when he wrote it—except that *long* or *prolonged* may have meant many months in Sun Tzu's era, whereas today they could mean hours or days. Very simply, *short* is categorically good, and *long* is categorically dangerous and bad—because of something called the “time value of action,” which in turn derives from the phenomenon of shock effects produced by compressed, parallel attacks on

centers of gravity. During serial attack, the opposite of parallel attack, forces attempt to affect one or a small number of strategic centers of gravity sequentially over time.

To realize the future picture, we must change the opponent system, which we do by affecting one or more of its centers of gravity. The resulting impact on the system will be a function of how quickly the centers are affected. If we do so too slowly (serially), the system will probably find ways to repair itself, protect itself against further attacks, and begin its own operations against its opponent's systems. Conversely, if we affect enough centers of gravity quickly enough (in parallel), the system will go into a state of paralysis, preventing it from repairing itself, protecting itself against future attacks, or making competent attacks against its opponent's systems. Over the last half century or so, we have actually seen several examples of both the serial and parallel approaches.

In World War II, the United States conducted serial aerial attacks on German targets in 1943.⁹ The US Eighth Air Force, for example, hit only about 11 target areas that could be considered "centers of gravity"; six of these went directly or indirectly against fielded forces (aircraft and ships). Of the remaining five, only the attacks on marshalling yards, synthetic oil installations (three attacks total against two locations), and, to some extent, ball bearing factories approached the status of a second-ring (processes) center of gravity that could have had a general impact on Germany as a whole. Note that no attacks occurred on ring one (leadership) or on such key ring two (processes) targets as electricity, command and control communications, energy other than oil, transportation other than rail marshalling yards, food, finance, or radio broadcast, to name just a few. At the time, attacking some of these centers of gravity lay beyond the available technology. In addition, we followed a very measured rate of attack: none (involving more than 10 aircraft) took place during 21 weeks of the year, and the median number of attacks per week for the

entire year was just *one*.¹⁰ Although these strikes caused considerable damage and forced the Germans to reallocate resources for defense and repair, Germany as a system functioned well at the end of the year. Due to bad weather and bomber diversion to support the planned D-day invasion, attack intensity effectively moved operations from serial to parallel only at the end of 1944. By the conclusion of the war in May 1945, the changed use of airpower had become a key factor in creating a state of paralysis in Germany because too many things were broken to allow effective repair, defense, or competent counterattack.

A similar phenomenon took place in Operation Allied Force against Yugoslavia (Serbia) in 1999: serial attacks in the first month went largely against fielded forces. Serbian leader Slobodan Milošović's forces operated effectively under this attack methodology, even stepping up operations in Kosovo. After the attacks in the second month became parallel and included direct leadership and process centers of gravity, internal dissension at the highest levels of government appeared within a week; Yugoslavia claimed it was withdrawing forces from Kosovo two weeks thereafter; and in the eighth week following the change in attack methodology, Yugoslavia essentially offered to capitulate by saying it would accept the European Group of Eight's "principles for a peace deal."¹¹

Movement from the parallel domain to the serial domain causes the probability of success to begin to fall dramatically.¹² Taking a very long time decreases the chances considerably. It isn't impossible to win a long war, but the odds are very low—and this applies to both sides, despite significant differences in their centers of gravity. Since good strategy depends heavily on understanding probabilities, deliberately embarking on a low-probability, long serial war does not make much sense.

Another phenomenon occurs as we move into the serial domain in war or business. In war the cost of operations goes up dramatically in terms of lives, money, and equipment for both sides. Conversely, and

somewhat paradoxically, a parallel attack is actually less costly for both sides although initial commitment and expenditures may be higher than for the serial strike. In business the costs include time to market, inefficient use of people and facilities, and lack of strategic information. The huge difference manifests itself when we look at the cost from inception to conclusion. In addition the cost associated with operating in the parallel domain is reasonably clear in part because predicting the short term is far easier than predicting the long term. Foreseeing the cost of serial operations is extraordinarily difficult, and actual expenses almost always far exceed the estimates. Examples abound, including estimates for government acquisition projects and those for the cost of wars. Figure 3 captures the concept of the time value of action, showing some of the many things that may go wrong as a protagonist moves into the serial domain. It also depicts an averaged line for the cost of operations.

Very simply, whether in war or business, our normal approach to the time element is exactly backward: we ask ourselves how long something will take rather than decide

how long it should take in order to create parallel effects and succeed at an acceptable cost. So important is this concept that we can use it to help determine whether or not we want to go to war. If we cannot or will not operate in the parallel domain, then we should first look for ways to avoid war (in any event, probably a reasonable course in most instances).

We began by suggesting that our war concepts and vocabulary were outmoded and dysfunctional and that we still follow an ancient idea of war captured in Clausewitz's focus on battle. The old ideas had some practical value in the past when the military forces available to any state or organization were small and had limited speed and range. On the one hand, if an organization defeated the military of another organization, usually nothing stood between the victor and the real reason for war—seizing wealth, whether in the form of crops, land, gold, or slaves. On the other, failure to overcome the opponent's military lay one's own wealth open to seizure and destruction. Most of our thinking and operations, then, really flowed from the extraordinarily limited capability of the available forces, so we

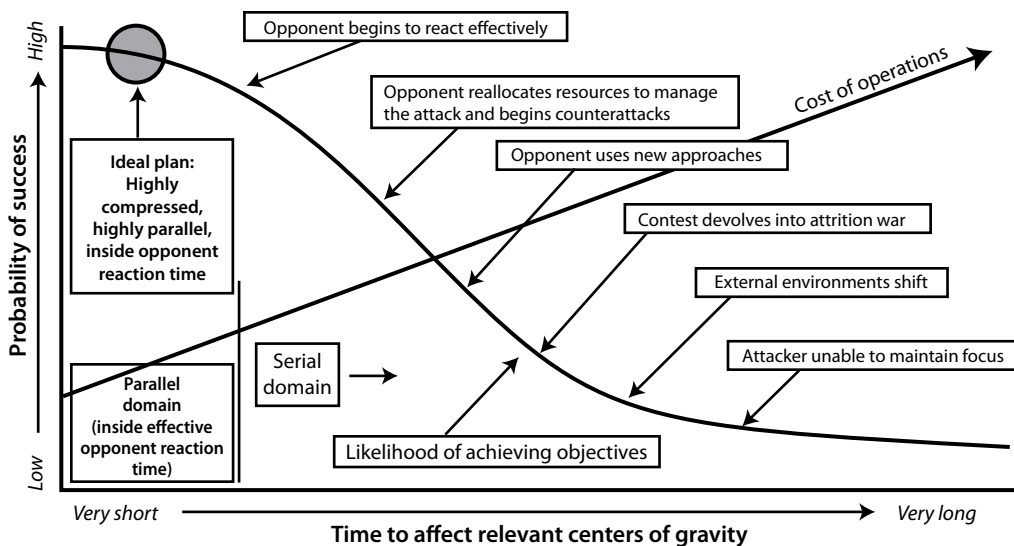


Figure 3. Time value of action

had no compelling reason to think beyond the battle. Imagine, however, that armies of old could have instantly transported themselves into the rich heartlands of their opponents where the plunder would have been theirs for the taking. Would not our whole concept of war have been much different? In addition, the military forces themselves could rarely attack more than one thing at a time, so they had to proceed serially. Only within the last 75 years has

the necessary components of war, by definition. We would then ask ourselves why we have wars. The answer is simple: we go to war to get something we otherwise would not have because another state or group will not voluntarily give it to us. War then is very clearly a means to an end—and thus not a strategic starting place. Obviously we will want things in the future that the possessor is not inclined to surrender, so the something becomes our strategic objective.

Airpower enables us to think about conflict from a future-back, end-game-first perspective as opposed to one based on the battle obsession of Clausewitz and his followers. It also opens another very exciting possibility: conflict with little or no unplanned destruction or shedding of blood.

airpower made it possible to attack multiple centers of gravity in parallel. Can there be any question that we desperately need to rethink war?

Airpower enables us to think about conflict from a future-back, end-game-first perspective as opposed to one based on the battle obsession of Clausewitz and his followers. It also opens another very exciting possibility: conflict with little or no unplanned destruction or shedding of blood.

Traditionally we have thought about war as quintessentially battle, bloodshed, and destruction; indeed, the tools of war previously available left us little choice. If, however, presented with a way to conduct war without unplanned destruction or bloodshed, would we shun or welcome it? Some would choose the former very quickly while others would choose the latter.

Those who would shun relatively bloodless war argue that without bloodshed and destruction, war would not be war and that, in any event, it would prove too tempting for the politicians. Let's assume for the moment that bloodshed and destruction are

Knowing the strategic objective, we start looking for the means to achieve it. Our choices would range from war defined as bloody and destructive to cajolery of some kind. In the middle of this spectrum, we might find something (currently nameless) that makes it physically impossible for a possessor of something we want to withhold it but involves little or no bloodshed and destruction. To make discussion easier, let's call this "bloodless force." If we had this option at a reasonable cost, we would probably choose it in those instances when cajolery failed and when we could not reasonably argue that we should take the bloody war path as a first choice. This brings us back to the other objection frequently raised to bloodless force—that politicians would resort to it too often.

We cannot know whether politicians would more frequently resort to bloodless force than they have to traditional war. In fact our ability to predict what politicians will do in any circumstance is rather close to zero. The argument might have validity if we had a long record of politicians avoiding

war, but such is not the case. The bloodiness and destruction of war seem to have had little dampening effect on politicians through the ages (perhaps just the opposite); thus, we have no reason to think that we would encounter many more instances of physical action against opponents than we have up to the present.

When we engage in conflict, we should always make our strategic objective the creation of a better peace. Normally, in a better peace the vanquished do not bear such hatred for the victors that another trial becomes inevitable. One way of reducing postconflict enmity involves lessening the suffering and recovery time of the defeated party. Traditional wars have perverse and long-lasting effects, but airpower may someday offer an alternative.

Some would agree that truly bloodless force would be great but that it is technologically impractical. And it might well be—today. Tomorrow, however, is a different story; we have already made great progress, as evidenced by the wars of the 1990s, in which high-tech powers represented one side of the conflict. Because airpower already has the ability to deliver energy with great accuracy (precision of impact), even now we can largely confine weapons to hitting their intended targets. The next step calls for making serious progress in achieving real precision of effect whereby the energy delivered does only what we want it to do. The new small-diameter bombs are a step in the right direction. With precision of effect combined with precision of impact, bloodless war becomes a reality.

To this point, we have tried to make the case that airpower can realize its potential of moving us into a new sphere of conflict only if it is tightly linked with a future-back, end-game strategy that rejects anachronistic ideas about war. Specifically,

- The best approach to strategy starts with a future picture, determines the systems and centers of gravity that must change to realize that picture,

takes into account the impact of time, and preplans an exit.

- We should focus on direct, strategic centers of gravity to the maximum extent possible.
- Our conflict vocabulary flows from ancient times and traps us mentally and physically into concepts that no longer make sense, so our vocabulary must change.
- The objective of a conflict is to achieve a future picture, not to kill and destroy.

Our last task, perhaps the easiest one, has to do with seeing if we can employ airpower effectively in the service of system-centric rather than battle-centric strategy—and do so in such a way as to move to a more efficient, effective approach to conflict that does not emphasize death and destruction.

With regard to strategy and airpower,

- Strategy provides the framework for finding the best means to attain objectives.
- If we want to change our opponent as a system to conform to our objectives, then the most direct approach entails affecting opponent centers of gravity closely related to the objectives.
- Fast action and short conflicts are imperative and far less expensive than slow, long ones.
- As we consider conflict, we should explore bloodless-force options exhaustively before reverting to traditional war and battle.
- “Battle” is at best an expensive and risky means to a distant end, and we should almost always avoid it.

If we accept these points, we can begin to find the means to realize them.

Our options, in the broadest sense, include ground power, sea power, and airpower, but before we examine them, some amplification is worthwhile. In the world of real organizations, armies and navies have

airpower, while air forces normally have very little ground power beyond that needed for light security. To keep this simple, we will not talk about current service organizations. Thus, ground power is anything essentially tethered directly to the earth, including people, tanks, and artillery; sea power is anything that operates on or under water but does not include aircraft or missiles launched from ships; and airpower is anything guided that flies through the air and space, regardless of who owns it or its launch platform. If we want to avoid parochial arguments that confuse our assessment of the options, we need to stay with these definitions. After reaching conclusions, we can decide which organizations should own and operate the three types of power.

Ground power, the oldest and historically most prevalent tool of conflict, is slow and normally affects only an opponent's fielded forces—the outer, fifth ring that is only rarely directly connected to a strategic objective. Ground power has minimal ability to conduct parallel operations on its own or to operate without significant destruction and bloodshed.

Sea power can operate against centers of gravity directly or closely related to strategic objectives but only if those centers are accessible by water. Although much of the world fits into this category, much does not—and even the majority of states and organizations with coasts normally have a large number of their centers of gravity well removed from the sea. Sea power can move faster than ground power and can bring more centers of gravity under attack, but in most circumstances it cannot execute parallel operations. It can conduct operations with far less destruction and bloodshed than ground power.

Airpower can operate against virtually all of the centers of gravity directly related to strategic objectives, regardless of their location. Because it can bring many under attack in compressed periods of time, it is well suited for parallel operations. Finally, airpower can produce appropriate effects with little destruction and bloodshed, if desired.

The overwhelming, game-changing value of airpower should be clear—but such is not the case for the majority of government officials and military officers, including many who operate some facet of airpower. To see such a valuable resource properly used, however, we Airmen must stop thinking we can do so via the two methodologies most prominent in the last few years: trumpeting our spectacular technology and asking merely to be treated as equal members of a team composed of the three forms of power. The technology is spectacular, but we should take a page from business, which long ago learned that selling a product had to involve much more than touting its technical goodness. Products sell because customers see them as filling a real need in their lives; airpower advocates have not done well in this regard. If airpower is something different, we must highlight its differences and show convincingly that it fills a vital need.

This brings us back to strategy. Our sale of airpower—which, like it or not, has to precede its smart application—must start by connecting it uniquely to a new approach to success in conflict. If our approach to strategy finds acceptance, airpower becomes the obvious solution; if it fails, we are just another hawk of new gizmos. Marketing, then, becomes a number-one priority for airpower even though many airpower advocates are not very comfortable with or knowledgeable about it.

We must direct our marketing toward taxpayers and decision makers at large; indeed, we must think through the problem in the same way we would think through something like the Iraqi invasion of Kuwait in 1990. That is, we must have a future picture of airpower, understand the need to change our own system, apply our efforts against centers of gravity within our own system, and strive to operate in parallel so as to give ourselves maximum probabilities of success at the lowest possible cost. If we don't take this approach, we limit ourselves to trying to convince advocates of ground

power and sea power to agree to something they think is against their best interests.

Our successes with airpower over the last century have flowed primarily from connecting it uniquely to a new approach to success in conflict. When the public and senior civilians in government understood the value of airpower, including the cost of depending on other means, plans for novel application won acceptance—witness the British use of airpower in 1920s Mesopotamia, emphasis on airpower in the 1930s as another European war loomed, long-range aerial attacks on Germany and Japan as a major part of the World War II effort, the huge investment in airpower as a weapon and deterrent in the first half of the Cold War, and the use of airpower in the 1990s. None of these efforts could have happened had they depended on a vote by the “joint team.” In other words, airpower has enjoyed success when it played what we might call the outside game and far less success when it tried to play the inside game.

Airpower exponents not only need to connect airpower directly to strategy and market their product well, but also need to start believing in it. Those who begin a discussion by noting that airpower “can’t do everything” do themselves and their listeners a real disservice. They probably mean that military power cannot do everything or fulfill some objectives—a completely true statement. If, however, a problem is amenable to military solution, why disqualify airpower from any aspect of it? Why should we start out with “airpower has limits” in

our mind instead of “airpower has no limits”? In other words, we should at least begin with the presumption that airpower can carry out any military task. If we fail to do so, we create a self-fulfilling prophecy and don’t even examine the possibilities because “everyone knows” we have always used bayonets guided by human beings as the preferred tool and that will “never change.” Offhand, I can think of only one thing that airpower cannot do and that some other form of military power can: physically take people into custody. But if it won’t work today, what would we need to do to make it work tomorrow?

After careful consideration of a problem, we may decide that airpower will not work. That is an acceptable answer—for now.

Of course, espousing the unlimited concept of airpower exposes the advocate to charges of airpower zealotry, a lack of “jointness,” or some other nasty label. But we need to become confident enough to shrug off these labels. At one time, Airmen refused to be marginalized by such attacks and pressed on to do the impossible, time after time. If we want a brighter airpower tomorrow and a brighter, more affordable, more effective, and lower-risk future for our nation, then we must reclaim the courage and confidence of our forebears. If we do, we can reforge airpower into an invaluable concept for our nation and civilization—one that will return huge dividends on the human and monetary investments needed to realize its extraordinary promise. ★

Notes

1. The quotation from Western Union is widely attributed to a company internal memo dated 1876. See, for example, *All Great Quotes*, http://www.allgreatquotes.com/stupid_quotes124.shtml. For the Olsen quotation, see Jonathan Gatlin, *Bill Gates: The Path to the Future* (New York: Avon Books, 1999), 39.

2. See *Great-Quotes.com*, <http://www.great-quotes.com/quote/861686>.

3. *Encyclopedia Britannica*, academic ed., s.v. “Military Aircraft: Early History,” accessed 23 November 2010, <http://www.britannica.com/EBchecked/topic/382295/military-aircraft/57483/Early-history?anchor=ref521642>.

4. Carl von Clausewitz, *On War*, rev. ed., ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1984), 97.

5. Two or more people who are cooperating constitute a system.

6. Sir B. H. Liddell Hart, *Strategy* (New York: Meridian, 1991), 204.

7. A key part of the British Briggs Plan to defeat the insurgency called for isolating insurgents from their supporters among Malaya's ethnic Chinese population. The plan involved the forced relocation of about 500,000 rural Malaysians, including 400,000 Chinese, from squatter communities into newly constructed guarded camps called New Villages designed to keep the inhabitants in and the guerrillas out. Many relocated people became content with the better living standards in the villages. See *Wikipedia: The Free Encyclopedia*, s.v. "Malayan Emergency," accessed 28 November 2010, http://en.wikipedia.org/wiki/Malayan_Emergency.

8. Sun Tzu, *Sun Tzu on the Art of War: The Oldest Military Treatise in the World*, trans. Lionel Giles (Toronto: Global Language Press, 2007), 11, 12.

9. RAF Bomber Command was quite active during 1943, but it directed virtually all of its attacks against cities at night, with a major objective of "lowering morale and de-housing workers." See Richard G. Davis, *Bombing the European Axis Powers: A Historical Digest of the Combined Bomber Offensive, 1939-1945* (Maxwell AFB, AL: Air University Press, April 2006). I extracted my data from the book's CD, which includes the files "1943.xls" and "I Sheet Key.pdf." The quotation above comes from p. 6 of the latter file in a section entitled "General Information."

10. Ibid. Data extracted from CD files "1943.xls" and "I Sheet Key.pdf." For this analysis, I counted as an "attack" only missions that started with 10 or more aircraft. Of the approximately 72 missions of fewer than 10 aircraft, 29 hit undefined industrial areas, and 30 ended up striking undefined targets of opportunity (in 1943 the latter generally meant any alternative target, selected when aircraft could not find assigned targets due to bad weather). The 11 target categories hit in 1943 are as follows (the number in parentheses indicates the ring in which I believe the target would have fit using the five-ring system): aircraft manufacturing (five); bearings (two); industrial areas (three or four); marshalling yards (two); synthetic oil plants (two); port areas (five); shipping (five); steel (two); rubber (two); tires (five); and U-boat shipyards (five). As an aside, if I were planning a similar attack against a similar opponent today, I would not hit steel, industrial areas, or rubber because they do not have a general impact on the enemy as a system and therefore are not really ring-two targets.

11. "Operation Allied Force," *GlobalSecurity.org*, accessed 28 November 2010, http://www.globalsecurity.org/military/ops/allied_force.htm.

12. I use the word *domain* in this context to illustrate the dramatic difference between the world of serial and parallel attacks. The US Air Force does not refer to serial and parallel domains, using the word *domain* in connection with air, space, and cyber.



Col John A. Warden III, USAF, Retired

Colonel Warden (USFA; MA, Texas Tech University) retired from the Air Force as commandant, US Air Force Air Command and Staff College, Maxwell AFB, Alabama, in June 1995. In his active duty career, he had extensive experience in flying, command, and staff positions. He has more than 3,000 flying hours in a variety of aircraft, including the F-4, OV-10, and F-15; flew over 250 combat missions in Vietnam as a forward air controller; and served as commander of the 36th Tactical Fighter Wing in Germany. His nonflying assignments included two tours on the Air Staff with the second as deputy director for war fighting, in which capacity he led the planning effort to develop the strategic air campaign (originally titled Instant Thunder) for the first Gulf War. After the war, he was a special assistant to the vice president of the United States, focusing on American-competitiveness issues. Following his retirement from the Air Force, Colonel Warden founded Venturist Incorporated, which has specialized in helping a wide variety of companies improve their results through strategic thinking and execution. He has appeared on a number of television programs and is the author of two books: *The Air Campaign* and *Winning in FastTime*. Colonel Warden is a graduate of Squadron Officer School (correspondence), Air Command and Staff College (seminar), and the National War College. His decorations include the Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit, Distinguished Flying Cross, and Air Medal with 10 oak leaf clusters.

Forty-Five Years of Frustration

America's Enduring Dilemma of Fighting Insurgents with Airpower

Dr. Mark Clodfelter



Analogies are popular among strategists, and the Vietnam War is a favorite target for comparisons. Pundits, policy makers, journalists, and historians have raised the specter of a Vietnam-like quagmire in virtually every conflict that the American military has fought since the fall of Saigon, and the current conflicts in Iraq and Afghanistan are no exceptions. As America's involvement in Iraq deepened, the cover of the 22 November 2003 issue of *National Journal* displayed the headline "Iraq as Vietnam"; one year later, the cover headline in *Newsweek* read, "Crisis in Iraq: The Vietnam Factor"; and one year after that, the cover of *Foreign Affairs* highlighted

its lead article "Iraq: Learning the Lessons of Vietnam" by former secretary of defense Melvin Laird.¹ Similarly, the 9 February 2009 cover of *Newsweek* read, "Obama's Vietnam: How to Salvage Afghanistan."² Bob Woodward's recent book *Obama's Wars* recounts that Vietnam "ghosts" affected Pres. Barack Obama's decisions to increase troop totals in Afghanistan and relates a November 2009 warning that Vice Pres. Joe Biden gave to the president on the need for firm direction in dealing with the Afghan War: without strong guidance, Biden insisted, "we're locked into Vietnam."³

Despite such seemingly specious pronouncements, parallels between Vietnam

and the current conflicts *do* exist, although to say that Vietnam provides an exact template for gauging military actions today is naïve. All wars are unique; disparate variables mix together to form the specific context of each; and what works in one may be a prescription for failure in another. In many respects, the conflict in Vietnam has far more dissimilarity than congruence to the wars in either Iraq or Afghanistan. Yet, for strategists to dismiss the example of Vietnam when evaluating America's actions in Iraq and Afghanistan would be a mistake. Although the enemies that the United States faced in Vietnam differ in many ways from those confronted in Iraq and Afghanistan, the type of war waged by current foes reflects the intermittent guerrilla struggle waged by the Vietcong and their North Vietnamese allies for most of Lyndon Johnson's presidency. Likewise, President Johnson's goal of a stable, independent, noncommunist South Vietnam, which proved extremely difficult to translate into viable military objectives, mirrors the political goals now sought by President Obama in Afghanistan and Iraq. In addition, President Obama, much like Johnson, must consider the global ramifications of his actions in choosing the instruments of American military power best suited to achieving his political aims.

President Johnson concluded that airpower was a key military instrument that could limit the ability—and will—of enemy forces to overthrow the American-backed regime in Saigon. President Obama has also turned to airpower to help preserve nascent governments in Baghdad and Kabul. The Vietnam example presents an intriguing comparison to current airpower efforts, given the similarities between America's political objectives and the type of war waged by the opposition. Collectively, those episodes illustrate the inherent difficulty of using bombs to help attain broad-based political goals against determined enemies who eschew conventional combat and who have substantial backing on the stage of world public opinion. Although the Vietnam experience may not produce any de-

finitive answers for Iraq or Afghanistan, it does provide, as B. H. Liddell Hart pointed out regarding the value of history, "the opportunity to profit by the stumbles and tumbles of our forerunners."⁴

Cultural Comparisons

One significant difference between Vietnam and the current conflicts is the composition of the belligerents. In Vietnam, religious and ethnic distinctions were minimal among the local combatants, and political/ideological goals dominated the fight for control of the South.⁵ National Liberation Front insurgents, known by their moniker "Vietcong" or "VC," received manpower and material support from their North Vietnamese partners to help overthrow the American-backed Saigon government. Indeed, Ho Chi Minh sent increasing numbers of North Vietnamese troops south until by August 1967 the North Vietnamese Army (NVA) comprised 45,000 out of a total estimated enemy force of 300,000, the remainder of whom were Vietcong.⁶ South Vietnam ultimately raised a substantial ground force of almost a million men, and many received American training.⁷ That force proved inconsistent in battle, however, causing President Johnson to increase American troop totals from 16,000 advisers in 1963 to an active force of more than 500,000 men by the time he left office in 1969. He also secured limited assistance from America's Asian allies, including 50,000 South Korean troops.⁸ Yet, to numerous South Vietnamese—including many who supported the Saigon regime—the ethnically distinctive Americans and their allies appeared as occupiers.⁹

The ethnic and religious homogeneity of the Vietnamese stands in stark contrast to the disparity among the local combatants in Iraq and Afghanistan. In Iraq the Shiite-Sunni split has produced considerable sectarian violence, and in 2010 fighting still claimed hundreds of civilian lives a month.¹⁰ Many religious leaders, such as Moqtada al-Sadr, have formed militia armies

that, on occasion, have clashed with government forces as well as those of opposing sects. Ethnic differences also abound. The Kurdish minority in the northern part of the country has long harbored hopes of independence, yet Kurds—along with Shiites—comprise significant segments of Iraq's security forces. As of September 2010, those forces consisted of more than 660,000 men although their reliability has been inconsistent despite intensive training efforts by American troops.¹¹ Besides the militias, indigenous criminal elements have gained periodic footholds in some parts of the country, extremist groups and Baathists still conduct frequent attacks, and a smattering of bombers continues to arrive from Syria.¹² Technically, the United States has ended its combat role in Iraq but maintains almost 50,000 troops there, and in 2010 hostile fire had claimed 20 American lives by November.¹³

In Afghanistan a disparate assortment of tribal clans prone to waging internecine warfare makes the prospect of a unified war effort against Taliban and al-Qaeda elements a thorny proposition. Sectarian differences abound as well: the largest clan, the Pashtun, contains predominantly Sunni Muslims with a smattering of Shiites though it is itself divided into two major tribes, the Ghalji and the Durrani; the Tajiks, another large clan, are a mix of Sunni and Shiites; the Farsiwans are Shiites; the Hazaras are a blend of Sunnis and Shiites; and the Uzbeks and Turkmen are Sunni.¹⁴ More clans exist, with a corresponding blend of sectarian loyalties, and the territory of many spans across borders into Pakistan, Turkmenistan, and Uzbekistan. In September 2010, the Afghan National Army totaled 138,200 men, comprised of troops from multiple clans trained by North Atlantic Treaty Organization (NATO) advisers.¹⁵ NATO's own 140,000-man International Security Assistance Force (ISAF), which now includes nearly 100,000 Americans, heightens the ethnic disparities in the country as those troops work to bolster the government of Hamid Karzai, a Durrani Pashtun who has often criticized NATO and American efforts.¹⁶

Policy Comparisons

In Vietnam President Johnson also worked to keep a fledgling government viable. He defined America's war aim in Southeast Asia as a stable, secure, noncommunist South Vietnam—a goal that defied quantifiable measures of progress—and he saw the struggle there as a key episode in the broader effort to contain worldwide communist aggression.¹⁷ Accordingly, he viewed Ho as a minion of the Soviet Union and China, and gauged American actions to preserve a noncommunist South Vietnam in terms of how they might trigger responses from Moscow or Beijing. Johnson was further concerned about how American actions might be viewed on the stage of world public opinion, where the image of an American Goliath pounding a hapless North Vietnamese David would undercut not only American efforts to bolster the South, but also the support needed to thwart communist advances elsewhere in the world. Finally, the president sought to minimize the amount of attention that Vietnam garnered from the American public because Johnson wanted that public focused on funding his Great Society programs at home, not on paying for a war 8,000 miles away.

America's objectives in Iraq mirror the expansive goals sought in Vietnam. Pres. George W. Bush initially sought a specific objective—the removal of Saddam Hussein from power to prevent him from obtaining weapons of mass destruction. After realizing that goal, the president expanded the aim to fostering democracy as well as bringing security and stability to the country.¹⁸ Much like President Johnson in Vietnam, with Cold War superpowers China and the Soviet Union hovering in the background, President Bush had to consider the backdrop of the war against global terror in deciding what actions to take in Iraq. Applying too much force could spur enemy recruiting, either from radical fundamentalists outside the country, such as al-Qaeda, or from factions within the country who viewed the excess force as a direct assault on their par-

ticular ethnic or religious group. President Obama has continued to work for Iraqi security and stability.¹⁹ Although the level of violence has lessened, compared to that faced by his predecessor, Americans and Iraqis continue to die from violent acts, and the nation remains insecure.

President Obama faces similar challenges in Afghanistan, where goals of security and stability have also dominated American efforts since the initial focus on eliminating the Taliban regime. In Afghanistan, though, the president must blend his objectives with those of NATO and its multinational force, and those aims do not always mesh well. In addition, disparate Afghan clans provide varying degrees of support to the al-Qaeda and Taliban enemies, some elements of which reside across the border in Pakistan—a nuclear state that has its own problems of security and stability—which has, on occasion, assisted the Afghan Taliban.²⁰ In both Afghanistan and Iraq, the lofty goal of democracy that once guided American efforts has slowly morphed into “accommodation,” but achieving that objective has proved no less daunting a task, given the abundance of ethnic and sectarian differences plaguing the two nations.²¹

During his speech at West Point in December 2009, President Obama outlined American objectives in Afghanistan in more specific terms as denying al-Qaeda a safe haven, reversing the Taliban’s momentum and preventing it from overthrowing the government, and strengthening Afghanistan’s security forces and government so that they could “take the lead responsibility for Afghanistan’s future.”²² To help attain those objectives, he authorized the deployment of an additional 30,000 American troops and stated that American forces would begin withdrawing from Afghanistan in July 2011. The Afghan troops would then begin to assume a larger role in providing security, an approach similar to the “Vietnamization” plan that was the cornerstone of America’s strategy in Vietnam during the last years of that conflict.

Following Similar Paths

Besides the broad American political goals that have accompanied the wars in Afghanistan and Iraq, the *type* of conflict that has emerged in those two nations bears an eerie similarity to the type of war that confronted the United States in Southeast Asia during the bulk of the Johnson presidency. In contrast to Vietnam, both Iraq and Afghanistan began as conventional conflicts and rapidly evolved into sporadically waged guerrilla wars, while Vietnam was predominantly an insurgency when America intervened with active force in 1965 and stayed that way until the 1968 Tet offensive, which decimated the Vietcong. Like President Johnson, President Obama has spent much of his presidency trying to defeat insurgents adept in guerrilla tactics; President Bush did so as well. Also like Johnson, both Bush and Obama turned to airpower—bombing in particular—to play a substantial role in defeating the insurgent enemies. Given the combination of America’s expansive political goals and the enemy’s method of waging war, airpower’s ability to achieve positive results has proved problematic.

Lyndon Johnson turned to bombing as his first military option to halt the Vietcong insurgency. Believing that the VC could not fight without the support of the North Vietnamese, Johnson aimed to stop the flow of military supplies and men from Hanoi to South Vietnam. Airpower seemed ideally suited to the task—the president could carefully control the intensity of the bombing, thus avoiding an outcry from the Chinese or Soviets, or the world public at large, and preventing the American public from diverting its focus from the Great Society. Moreover, airpower was a “cheap” alternative to ground troops in terms of risking American lives, and its use was likely to bolster the resolve of the Saigon government and its armed forces. Finally, a bombing effort of gradually increasing intensity would signal Ho that his country faced ultimate destruction from the air and persuade him to call off the Vietcong insurgency to avoid his

country's ruin. Those fundamental assumptions guided Johnson's "Rolling Thunder" air campaign against North Vietnam when it began in March 1965.²³

Unfortunately, the assumptions proved incorrect. The Vietcong (and their North Vietnamese allies) fought an average of only one day a month and hence needed a meager 34 tons of supplies each day from sources outside South Vietnam—an amount that just seven two-and-a-half-ton trucks could deliver.²⁴ As long as the enemy chose to fight such a sporadic war, no amount of bombing could stop the paucity of supplies it needed. The morale boost that the Saigon regime received from Rolling Thunder soon ebbed, while Ho gradually increased the numbers of NVA troops heading south. He appreciated the constraints that limited Johnson's bombing and knew that he had little to fear from it. President Johnson turned to additional American ground forces to confront the VC and the NVA, and Rolling Thunder continued with gradually increasing intensity for the next three years—the rationale now was that it would limit the magnitude of the war that the enemy could wage in the South. The surprisingly large scale of the 1968 Tet offensive shattered that myth.

Despite the three-and-a-half-year duration of Rolling Thunder, it accounted for only a fraction of the bombs that fell on Southeast Asia during America's eight-year struggle there. The United States ultimately dropped eight *million* tons of bombs, with one million of those falling on North Vietnam, three million on Laos and Cambodia, and *four million tons* falling on its *ally*, South Vietnam.²⁵ In contrast to the highly constrained bombing of the North—which killed an estimated 52,000 civilians during Rolling Thunder—attacks on Southern targets had relatively few restrictions.²⁶ To bolster security, American commanders created "free-fire zones," hostile areas in which American or South Vietnamese troops removed all inhabitants and deemed anyone who then ventured into the zones an enemy combatant. Air strikes frequently occurred in such areas once people appeared in

them, but they were just as likely to be innocent peasants returning to their ancestral homes as they were to be Vietcong. Both the VC and NVA took advantage of the American propensity to rely on airpower when it was available. A favorite tactic involved placing one or two snipers in a hamlet and hoping that the Americans would respond with an air strike that destroyed the village.²⁷ In a war purportedly waged for "hearts and minds," indiscriminate firepower was the insurgents' best friend, and many of the four million tons of bombs that fell on South Vietnam were anything but discriminate.

Indiscriminate firepower has *not* been a staple of bombing in either Iraq or Afghanistan. Truly remarkable advances in "smart" munitions have occurred since their first widespread use over North Vietnam in 1972, and pilots today—whether in the air overhead or in ground control facilities half a world away—can launch bombs many miles from a target and have satellites guide them to within a few feet of the bull's eye, regardless of weather conditions. Of the 18,000 bombs dropped in Iraq by the US Air Force during the first month of Operation Iraqi Freedom in 2003, 11,000 were guided munitions, compared to only 15 percent of the 227,000 bombs and missiles delivered by allied air forces during the 43 days of Operation Desert Storm in 1991.²⁸ Similarly, in Afghanistan during the first five weeks of Operation Enduring Freedom in 2001, 2,300 of the roughly 6,000 bombs and missiles delivered were satellite-guided 2,000-pound Joint Direct Attack Munitions.²⁹

Regrettably, the overwhelming emphasis on smart bombs has not eliminated the prospect of civilian casualties. In October 2001, five villages near Kandahar collectively reported more than 100 victims of US air strikes; local commanders and Afghan officials corroborated the claims.³⁰ In the spring of 2003, bombing killed an estimated 1,500–2,000 Iraqi civilians during the first six weeks of Iraqi Freedom.³¹ Those deaths occurred during the periods in Afghanistan and Iraq dominated by conventional combat, in which American forces pursued the

“finite” objectives of wrecking the Taliban regime and eliminating its safe haven for al-Qaeda, and ousting Saddam—thus removing the perceived threat of Iraqi weapons of mass destruction. The fast-paced start of the two conflicts, with tangible war aims rapidly achieved, tended to downplay the effects of civilian casualties.

Enemies Changing Tactics

The episodic fighting that has since occurred in Afghanistan and Iraq not only has heightened the impact of civilian losses but also has revealed a fundamental change in initiative that bears a striking resemblance to Vietnam. The Vietcong and their NVA allies determined when and where they would fight, as well as how they would do so. During 1967 and 1968, the two years of peak combat activity in Vietnam for American troops, only 1 percent of American patrols made contact with the enemy; adding South Vietnamese patrols to the mix dropped the number to 0.1 percent.³² Yet, 1967 and 1968 were also the bloodiest years for American forces, claiming 10,000 and 15,000 American lives, respectively—of which 23.7 percent were lost to mines and booby traps.³³ During the frequent lulls in open combat, the unseen ordnance could produce 40 percent or more of American deaths.³⁴ Airpower and artillery provided a steady supply of booby-trap explosives since the dud rate for bombs dropped by B-52s was 5 percent, and that from artillery shells 2 percent, which together equated to more than 800 tons of ordnance *a month* available to the enemy.³⁵

In both Iraq and Afghanistan, the insurgents have also frequently dictated the war's tenor and tactics. In both locales, the percentage of American lives lost to improvised explosive devices (IED) has eclipsed those lost to unseen munitions in Vietnam. As of 10 November 2010, IEDs had caused nearly two-thirds of the 3,483 American combat deaths in the Iraq war and had wounded 21,583 American military personnel.³⁶ Relying on roadside bombs instead of

open combat, Iraqi insurgents have minimized their exposure to American firepower in ways that require few external supplies; the disbandment of Saddam's army in 2003 produced an array of ordnance scattered throughout the country. Such tactics have become the norm in Afghanistan as well, where Taliban and al-Qaeda fighters increasingly rely on hidden munitions to employ against American and NATO troops. By mid-November 2010, US forces had suffered 1,058 combat deaths in Afghanistan; of those, IEDs were responsible for 583.³⁷ From October 2009 to October 2010, rates of effective IED attacks increased 30 percent in Afghanistan.³⁸

Attempts to thwart this sporadic enemy combat activity with airpower have produced mixed results. In concert with the 2007 “surge” of an additional 30,000 American Soldiers in Iraq, five times as many air strikes occurred that year compared to 2006.³⁹ Air Force leaders said that the added troops had pushed insurgents out of urban areas and into places easier to target and that better intelligence had provided a clearer picture of the battlefield. Still, the bombing that occurred since the beginning of April 2007 had produced more than 200 civilian deaths by the end of the year. Hellfire missile attacks by Apache helicopters and Predator drones also significantly increased, with more than 200 Hellfire strikes occurring in Baghdad during a two-month span in spring 2008.⁴⁰ Many of those raids targeted enemy elements in the heart of the city, and despite intense efforts to avoid civilians, such losses still occurred. “It's not Hollywood and it's not 110 percent perfect,” commented an aviation brigade commander. “It is as precise as very hardworking soldiers and commanders can make it. These criminals do not operate in a clean battle space. It is occupied by civilians, [including] law-abiding Iraqis.”⁴¹

In Afghanistan, American and NATO aircraft conducted 3,572 air strikes in 2007, more than double the total for 2006 and 20 times the number for 2005. That bombing caused an estimated 300 civilian casualties in 2007,

triple the number reported for 2006.⁴² An air strike by B-1 bombers in May 2009 against insurgents in Farah province may have killed as many as 86 civilians.⁴³ In response to such losses, Gen Stanley McChrystal, who took command of American forces in Afghanistan a month later, ordered his troops to break off combat with insurgents who hid among villagers. He further restricted the use of airpower and artillery in such situations. "Air power contains the seeds of our own destruction if we do not use it responsibly," he stated in June 2009. "We can lose this fight."⁴⁴

The ramifications of such civilian deaths loom large for the prospects of realizing the overarching goals of security, stability, and a semblance of democracy. After a 12 October 2007 air strike on an insurgent stronghold near Baghdad killed nine children and six women, Rear Adm Greg Smith stated that the killings were "absolutely regrettable" but then blamed the insurgents for using civilians as a shield when they shot at a nearby American unit. "A ground element came under fire from that building that we had to neutralize," he remarked. "The enemy has a vote here . . . and when he chooses to surround himself with civilians and then fire upon U.S. forces, our forces have *no choice* but to return a commensurate amount of fire" (emphasis added).⁴⁵ In all likelihood, the "vote" went just the way the enemy wanted, and a Vietcong sniper team 45 years ago would have appreciated the technique. The civilian death toll from the bombing was one of the highest to result from a single American military action thus far during the Iraq war, and it received extensive media coverage.

In trying to take the initiative with airpower in Iraq and Afghanistan, American commanders actually risk undermining indigenous support for the new governments in Baghdad and Kabul. On 10 January 2008, two B-1s and four F-16s dropped a combined 20 tons of bombs on suspected militant hideouts, storehouses, and defensive positions in central Iraq. Americans had warned residents to leave the area, and most did, resulting in no civilian casualties.⁴⁶ Yet, such attempts to create "secure" areas

analogous to Vietnam's free-fire zones have not always met with success. Ten days earlier, American bombs meant for al-Qaeda instead killed three women and two children in the same area.⁴⁷ To limit collateral damage, the Air Force has resorted to dropping concrete-filled bombs to detonate IED sites and often relies on 250-pound GBU-39 "small-diameter bombs" to minimize blast effects. The key, though, is determining when civilians might be present near a potential target, and the Vietnam practice, now used in Iraq and Afghanistan, of "doing a show of force to get civilians out of the area" is no guarantee of positive results.⁴⁸

In July 2010, Gen David Petraeus replaced General McChrystal as American commander in Afghanistan, and soon afterward the number of air strikes began to increase significantly. From November 2009 through May 2010, US and NATO aircraft expended ordnance an average of 207 times a month; from June through October 2010 that monthly average increased to 517.⁴⁹ General Petraeus, who had commanded in Iraq during the "surge," had intensified bombing there in concert with the increase in American troops; the increased Afghanistan bombing has coincided with the arrival of the additional 30,000 troops that President Obama authorized in his December 2009 speech at West Point. The greater volume of air strikes has also produced increased civilian casualties although the "incident rate of causing civilian casualties has actually decreased," according to NATO.⁵⁰ Still, coalition forces killed 49 civilians in October 2010, compared to 38 the previous October, an increase of 30 percent. In contrast, insurgent forces killed or wounded 322 civilians in October 2010, a similar percentage increase from a year ago.⁵¹

Despite the greater number of insurgent-caused civilian deaths, those caused by coalition forces are the ones most likely to generate violent reactions from the Afghan populace. A July 2010 study by the National Bureau of Economic Research on the effect of civilian casualties in Afghanistan and Iraq found that "counterinsurgent-generated

civilian casualties from a typical incident are responsible for 6 additional violent incidents [against ISAF forces] in an average sized district in the following 6 weeks.”⁵² The study further noted that “the data are consistent with the claim that civilian casualties are affecting future violence through increased recruitment into insurgent groups after a civilian casualty incident.”⁵³ In short, “when ISAF units kill civilians, this increases the number of willing combatants, leading to an increase in insurgent attacks.”⁵⁴ The study cited revenge as a primary motive for the violent reactions (observing that similar reactions did *not* occur in Iraq) and noted that violence was more likely to occur in response to ISAF-caused civilian casualties than in response to insurgent-caused civilian deaths.⁵⁵

The war against the Afghan Taliban has also spilled across the border into Pakistan, which has served as a Taliban sanctuary in much the same way that Laos and Cambodia served as sanctuaries in Southeast Asia for the VC and NVA. In Pakistan, though, American air strikes have been far more discriminate than those in either Laos or Cambodia, which together ultimately received more than three million tons of American bombs. The American bombing of Pakistan began slowly, with only one air strike occurring in 2004 and again in 2005, three raids transpiring in 2006, and five in 2007. In 2008 the number jumped to 35; in 2009 to 53; and, as of 19 November, the 2010 total was 101.⁵⁶ Those numbers primarily consist of drone missions, controlled by the Central Intelligence Agency, though they do include some Air Force strikes and a limited number of helicopter attacks.⁵⁷ Since 2006 the *Long War Journal* estimates that air strikes in Pakistan have killed 1,606 Taliban and al-Qaeda fighters (including 57 senior leaders) and 108 civilians, with 662 enemy combatants dying in 2010 compared to only 14 civilians.⁵⁸ Pakistani sources, however, claim that between 2007 and 2009, drone strikes killed 700 civilians and only 14 terrorist leaders; the perceived civilian losses

have produced outrage in Punjab and Sindh, Pakistan's two most populous provinces.⁵⁹

With increased bombing in both Afghanistan and Pakistan, the United States—despite all of its high-tech wizardry—has significantly increased the probability of collateral damage, and every occurrence of it diminishes the prospects of stability and security. Such episodes attract media attention and serve as excellent recruiting tools for opposition forces. In the final analysis, bombs cannot have a significant impact against a determined enemy who chooses to fight an infrequent guerrilla war. The crafty insurgent will rely on his asymmetric approach not only to negate America's airpower advantage but also to transform it into an instrument that furthers *his* cause. As long as the United States uses bombing to help attain such amorphous political objectives as “security” and “stability,” much less “democracy,” the insurgent is likely to thwart those efforts by waging a sporadic guerrilla war. Indeed, bombing can do little to negate the greatest threat to the civilian populace of both Afghanistan and Iraq—suicide terrorism—and evidence mounts that continued episodes of civilian deaths from airpower spur more suicide attacks.⁶⁰

In many respects, America's enemies in Iraq and Afghanistan (and Pakistan) face easier tasks than their Vietcong predecessors. The United States pursues goals in both of the current wars that are difficult to achieve and parallel those sought in Vietnam; moreover, it faces an array of disparate opponents in Iraq and Afghanistan compared to the homogeneous foes confronted in Southeast Asia. Facing these disparate opponents further complicates American strategy. In addition, whereas Lyndon Johnson and his advisers had to deal with the impact of media coverage that ultimately revealed bombing mistakes to the world at large, they did not have to grapple with the constant, instantaneous television coverage provided by such media giants as CNN, BBC, and Al Jazeera. That news, as well as the slant it receives from outlets like Al Jazeera, has a tremendous impact on molding the opinions of many in the Middle East, where 38 percent of the populace is illiterate.⁶¹

Final Observations

In so-called wars for hearts and minds, perceptions count more than reality—indeed, perceptions *are* reality. The skilled insurgent, whether motivated by political, ideological, ethnic, or religious concerns, will do everything he can to fight in a way that offers him the greatest chance of success. He will work hard to paint his cause in a positive light and to cast his enemy's efforts as evil. Open-ended American political goals, reliant on bombing as a key means to help realize them, play directly into the insurgent's hand and intensify the likelihood that he will wage a sporadic guerrilla war that American airpower is ill equipped to obstruct.

Airpower *can* play a role in defeating such an enemy, but bombing is not the answer. Lethal airpower against insurgents works well *only* when they can be isolated from the “sea” of population in which they prefer to “swim.” Against such a savvy opponent, those instances of isolation will be rarities. The nonlethal applications of air-

power—specifically, airlift and reconnaissance—greatly enhance America's ability to fight insurgent enemies, as demonstrated numerous times in Vietnam. The problem for American air chiefs—and political leaders—is that their default position for applying airpower is often its kinetic aspect. American air commanders today cannot be expected to forgo the bombing option when insurgents attack US troops or when intelligence pinpoints “high-value” targets. Yet, those commanders—and their political leaders—must have a complete appreciation for the potential costs of such bombing and for whether the potential long-term price is worth the desired short-term gain. In certain cases, the costs may appear justified. For most, though, restraint is probably the prudent course of action. The emphasis on kinetic airpower helped doom America's pursuit of broad-based political goals against an insurgent enemy in Vietnam and may well to do the same as America follows those footsteps in Iraq and Afghanistan. ✪

Notes

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Defending the Joint Force

Lessons Learned from Joint Base Balad

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Effective integration of joint forces exposes no weak points or seams to an adversary. They rapidly and efficiently find and exploit the adversary's critical vulnerabilities and other weak points as they contribute most to mission accomplishment.

—Joint Publication 1,
Doctrine for the Armed Forces of the United States

Italian general Giulio Douhet long ago noted that “it is easier and more effective to destroy the enemy’s aerial power by destroying his nests and eggs on the ground than to hunt his flying birds in the air.”¹ This concept is reflected in Air Force Doctrine Document 1, *Air Force Basic Doctrine*: “Air and space power is most vulnerable on the ground. Thus, force protection is an integral part of air and space power employment.”² However, base defense—defending one’s air assets on the ground—is one of the least understood operational aspects of airpower. Today’s Air Force strategy for defending air bases is known as integrated defense (ID) (formerly known as air base defense or air

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base ground defense). ID provides the requisite secure foundation from which the Air Force launches combat operations and protects its personnel and resources. Without strong ID, Air Force personnel and resources, as well as those of the joint force, are vulnerable to attacks that would decrease their combat effectiveness.

Prior to the wars in Iraq and Afghanistan, the Air Force considered threats outside the air base perimeter the responsibility of either the host nation or sister service forces.³ In 1985 the Air Force and Army signed Joint Security Agreement 8, which formally tasked the Army with the exterior defense of Air Force bases.⁴ By 2005 the Air Force had acknowledged that the Army would not have sufficient forces in some instances to perform exterior air base defense missions effectively. As a result, Air Force and Army leaders terminated the agreement, giving Air Force commanders more latitude in defending air bases with their own assets.⁵ In 2006 Brig Gen Robert Holmes, the Air Force's former director of security forces and force protection, wrote that "land-component maneuver forces will be stretched thin for the foreseeable future, so the Air Force must invest in its capabilities to securely project combat air and—now—ground power."⁶ In 2007 the Air Force announced a new strategy for defending air bases. This ID concept called for the "application of active and passive defense measures, employed across the legally-defined ground dimension of the operational environment, to mitigate potential risks and defeat adversary threats to Air Force operations."⁷ The ID operational approach called for new thinking that emphasizes ground intelligence-collection efforts in the operational environment and shifts security operations from a compliance-based model to a capabilities-based construct as a "fundamental battle competency for all Airmen, whether garrison or deployed."⁸ ID encouraged a truly collaborative base defense operation with joint and combined partners as well as a systems approach to defending air bases.

By 2008 the Air Force had accepted a new leadership role in Iraq when it became

the base operating support integrator (BOS-I) for Joint Base Balad (JBB) (formerly known as Logistics Support Area Anaconda and Balad Air Base). This role gave the Air Force responsibility for defending the base and its assigned joint forces, including the conduct of counterinsurgency (COIN) and counter-indirect-fire (IDF) operations outside the base perimeter.⁹ Personnel nicknamed JBB "mortaritaville" because it came under nearly daily attack by mortars and rockets, threatening both the combat mission and the joint force.¹⁰ Employing IDF, insurgents successfully interrupted and impeded operations. The base defense strategy prior to 2008 essentially chased the IDF shooters after attacks or employed counter battery fire against the incoming fire's point of origin. Before the Air Force became the BOS-I, one could describe the posture of exterior base defense as reactive:

In early 2004, Balad initiated a program to counter the insurgents [*sic*] stand-off attacks. The plan entailed the extensive use of UAV's [*sic*] [unmanned aerial vehicles], helicopters, counter-battery radar, and response forces to attack enemy forces *once they initiated stand-off attacks*. Quick reaction forces were positioned on-base (often helicopter transported) and off-base in vehicles. The results were more than disappointing—attacks against Balad increased dramatically.¹¹ (emphasis added)

It soon became clear that the service needed a new approach to base defense. As BOS-I the Air Force committed Airmen to an exterior base defense role in the largest combat deployment of security forces since the Vietnam War. Implementing an ID philosophy, that new role proved successful in defending JBB for several reasons: (1) the Air Force heeded lessons learned from defending air bases in Vietnam by committing intelligence analysts to ground defense intelligence; (2) Airmen took a proactive COIN approach designed to gain synergy with friendly and host-nation forces, best illustrated through the partnership with the Army ground force commander (known as the battlespace owner [BSO]), who controlled the terrain surrounding the installation; and (3) JBB organized a

unique ID method that featured tactics, techniques, and procedures designed to influence the battlespace as well as deter and disrupt attacks.¹² This success made JBB the model for implementing ID concepts in a combat environment. Reviewing the history of Air Force base defense—especially the important lessons from Vietnam—illustrates how Airmen applied historical lessons to JBB's operational environment, including innovative ways to counter IDF.

Learning from Vietnam

In both Vietnam and Iraq, IDF was the number-one threat to air bases because standoff weapons enable enemy forces to attack from a distance, thus giving them a better chance of survival. In Vietnam, Vietcong and North Vietnamese forces attacked American air bases 475 times between 1964 and 1973, primarily with IDF, destroying 99 US and South Vietnamese aircraft and damaging 1,170 aircraft.¹³ By contrast, insurgents have fired more than 340 mortars and

rockets against JBB since the Air Force took defense responsibility as BOS-I. These attacks resulted in no aircraft losses and only a few aircraft damaged; furthermore, just 50 percent of the rounds fired actually landed on the base.¹⁴ The adversary's IDF effectiveness against JBB, as measured by the latter criterion, was the lowest among the four most commonly attacked bases in Iraq. This fact indicates, among other things, that insurgents hurried their attacks, lacked the tactical loiter time needed for massing their fires, and feared the prospect of being either targeted by a ground patrol or videotaped by an air platform. (Videotape often serves as evidence in Iraqi courts.)¹⁵

Since US operations began at JBB, the base not only suffered more attacks than any other installation in Iraq but also came under IDF attack more frequently than all US air bases combined in Southeast Asia during a comparative range of years during the Vietnam War (see figure).¹⁶ As in Vietnam, JBB's IDF attacks profited from the terrain, which featured lush farmland, trees, vineyards, and the most complex ground in all of Iraq due to the

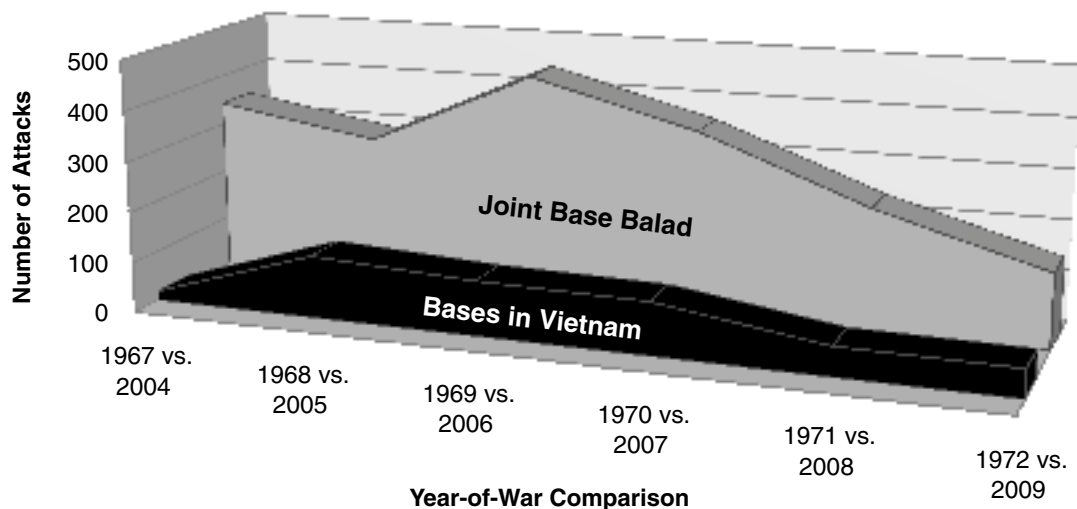


Figure. Comparison of attacks on Joint Base Balad to those on all US air bases in the Vietnam theater. (From Alan Vick, *Snakes in the Eagle's Nest: A History of Ground Attacks on Air Bases* [Santa Monica, CA: RAND, 1995], 69, http://www.rand.org/content/dam/rand/pubs/monograph_reports/2006/MR553.pdf. JBB data derived from Col Anthony Packard, 332d Expeditionary Security Forces Group, Joint Intelligence Support Element, 1 March 2010.)

concentration of irrigation systems and drainage canals that support the country's agricultural breadbasket. One hears echoes of Vietnam in the base defense challenges found in countering IDF in the terrain surrounding JBB. As a RAND report of 1995 observes, "The standoff threat, particularly from rockets, proved troublesome through the end of the [Vietnam] war. Given the nature of the conflict and the terrain, there was no foolproof countermeasure to this threat."¹⁷

In Iraq the security at JBB's entry control points and perimeter drove the enemy to IDF attacks as the course of least resistance, giving him the best chance for disrupting US operations. Each attack required personnel at the installation to take cover and clear the terrain of unexploded ordnance prior to returning to normal operations. The patterns of attack in Iraq have shown a lack of specificity in targeting, but their basic objectives sought to disrupt coalition military operations and inflict casualties in order to undercut the American public's resolve. Iraqi insurgent forces ranged from well-trained former Baathists to disenfranchised tribes with militia-like capabilities and unskilled attackers motivated solely by monetary reward earned from performing IDF attacks against JBB. Consequently, many IDF attacks were perpetrated by novices who undertook subcontract work for insurgent groups. JBB's counter-IDF strategy focused on deterring and disrupting attacks to prevent the enemy from massing fires for maximum effect. As a result, enemy IDF attacks were typically short in duration and performed hurriedly from unprepared firing positions.

Vietnam-era base defense and that at JBB also differed significantly in terms of the complexity of attacks. Those in Vietnam proved more effective because enemy forces had more freedom of movement, enabling them to mass fires and ground attacks due to the inability of air base defenders to effectively patrol the IDF threat ring around their installations. Vietnam theater air bases endured not only IDF attacks but also 29 sapper attacks, during which forces attempted

to penetrate bases to destroy aircraft and key defenses.¹⁸ Eight of those attacks utilized IDF as a diversion for base defense forces, thereby screening attackers during ground assaults.¹⁹ Unlike Vietnam, sapper attacks have not materialized in Iraq because they are highly complex, synchronized operations requiring a disciplined, trained military force lacking in the Iraqi insurgency.

Moreover, unlike Vietnam, the 2008 US-Iraq security agreement substantially altered the rules of engagement by making the war a "law enforcement fight" that obligated US forces to build criminal cases with supporting evidence against their attackers.²⁰ The agreement presented multiple limiting factors for defending the air base; nevertheless, it bolstered the larger strategic effort to support Iraqi rule-of-law programs and had the added benefit of making Iraqi police and courts the centerpiece of long-term Iraqi success. Furthermore, by requiring that the Iraqi police handle all cases against alleged insurgents and process them through the court system, the new policy promoted a more favorable image of US Airmen, casting them as partners in upholding the Iraqi rule of law rather than as an occupying force disrespectful of local authority. As such, Soldiers, Air Force security forces, Airmen with the Air Force Office of Special Investigations, and pilots from both services testified in Iraqi courts, resulting in successful criminal prosecutions under Iraqi law.²¹

Commenting on the US-Iraq security agreement of 2008, Maj Gen Mike Milano, USA, points out that "what we and the Iraqis are striving for is a condition known as police primacy. . . . Under police primacy, the Iraqi police forces have primary responsibility for internal security, under civilian control, in accordance with the Iraqi constitution and consistent with the rule of law."²² JBB, therefore, initiated further partnering with the Iraqi police and built a local police substation to provide a law enforcement partnership for the base. US Soldiers and Airmen worked alongside Iraqi police, often conducting joint and combined patrols and operations.

Knowledge of the Enemy: Committing Air Force Intelligence Analysts to Base Defense

In contrast to bases in Vietnam, JBB enjoyed a true commitment of intelligence assets for base defense. In Vietnam, Air Force intelligence assets emphasized air operations to the detriment of intelligence about *ground* base defense threats—a situation that proved highly problematic. As the Office of Air Force History notes, “Hobbling external security [in Vietnam] was the lack of reliable intelligence on enemy activities within striking distance of bases. This rose chiefly from the Air Force’s failure to generate tactical ground intelligence.”²³

To remedy this historical shortfall, the wing at JBB, as part of its BOS-I base-defense responsibilities, stood up a dedicated, ground-focused force-protection intelligence organization in November 2008. Led and manned by Air Force intelligence, surveillance, and reconnaissance (ISR) professionals, this joint intelligence support element (JISE) received assistance from contracted intelligence analysts. Robust ground intelligence operations fully enabled Army and Air Force ground forces to defend JBB through proactive deterrent patrols in areas where IDF tended to originate.

The BSO fully leveraged Air Force intelligence analysis and capacity to create a synergy with his own intelligence staff, thereby optimizing the JISE’s capabilities. This completely synchronized effort supported intelligence fusion designed to drive defense operations in the base security zone. The JISE’s goal of attaining predictive battlespace awareness called for foreknowledge and the ability to shape operations based not only on reviewing the enemy’s past actions but also on predicting actions he would likely take in the future. Classic approaches to intelligence based on analyses of historical trends tend to drive a defense posture that responds after attacks occur. In those paradigms, ground forces are no more than “shot responders” in a counter-IDF

fight, essentially sweeping for the enemy in the location from which the IDF round came, as indicated by radar and spotter reports. This reactive approach becomes a frustrating exercise comparable to a game of “whack-a-mole”: chasing the enemy around the battlespace without generating any lasting effects. Though only temporary, these results nevertheless require a tremendous expenditure of energy and resources.

The JISE’s analysis led to an intelligence-driven targeting process that enabled Air Force security forces to move from a mostly reactive defensive posture to a proactive scheme of maneuver. Lasting effects of this strategy require dominance of the human terrain within and outside an installation as well as understanding the relationships among key groups, tribes, and individuals. This reality drove Airmen to study and gain insights into the violent extremist networks operating in the area and to participate actively in mapping and pressuring these networks through a constant presence. Airmen fed the intelligence cycle by gathering information from relationships they had established in the battlespace, thereby closing the intelligence gap between themselves and the enemy network.

Joint ID operations adopted an intelligence-driven model that followed four lines of operation based on JISE analysis: (1) deny the enemy unobserved freedom of movement, particularly in traditional attack locations; (2) map out insurgent networks and identify key leaders, weapons facilitators, and support nodes; (3) establish patterns of life (i.e., determine who met with whom, when and where they met, and how they moved, shot, and communicated); and (4) map out the human terrain to discover fault lines among locals who hate the coalition, those who grudgingly tolerate but do little to help coalition forces, and, finally, the ones whom those forces might convince to support efforts to secure the installation and the area surrounding it.

This effort prompted the development of an intelligence-collection plan and opera-

tional framework that cycled over a two- to three-week period, maximizing the existing ground combat power. For example, denying unobserved freedom of movement everywhere at all times proved impossible with the resources at hand. However, intelligence analysis of historical data produced a strategy that denied the enemy access to his favored locations for launching attacks during the most likely times for hostile activities. Each intelligence objective had a list of sub-objectives for signals intelligence resources, a similar list for airborne ISR resources, and so forth, including one for security forces Airmen during their combat patrols.

Leveraging air assets directly enabled base defense. JISE strategy fostered a collaborative atmosphere among many joint players. Through the standard air tasking order and collection-management processes, the JISE obtained regular Global Hawk and Joint Surveillance Target Attack Radar System geospatial products as well as nationally derived intelligence products delivered through the combined air operations center's forward-deployed Air Force National Tactical Integration Cell. (It is more accurate to say "nationally derived intelligence products" since they were often of a multi-intelligence nature.) Despite the usefulness of these planned ISR assets, they were dwarfed by contributions of the expeditionary operations group and Army aviation units, both fixed and rotary wing, which delivered countless hours of "residual" ISR. To realize the most value from planned and residual airborne assets, the JISE had to produce, execute, and assess a comprehensive collection plan.

The JISE was effective at pulling together disparate units to reach a commonly desired end state: protecting its own people from IDF attacks. Because of the absence of an insurgent air threat and a paucity of opportunities to strike targets kinetically, pilots and air planners welcomed the opportunity to fly residual ISR to protect the base, utilizing their remaining fuel and loiter time after completing their primary mission. Members of the operations group col-

lected intelligence, logging hundreds of hours as they followed insurgent leaders to meetings at all times of the day and night, and Army aviation units loitered at a distance, capturing imagery of insurgents' patterns of life. The JISE orchestrated a collection plan adaptable to residual flight schedules to piece together persistent ISR 15 to 60 minutes at a time—the length of time that a residual asset would make itself available for the local ISR effort. The JISE collection coordinator produced a daily collection plan known as the "residual deck." For each collection target, the plan included specific elements of information meant to enable JISE analysts to fill gaps in their knowledge of the target, his activities, and insurgent networks associated with him. JISE partner analysts supplied crucial information about the activity patterns of each target by maintaining this information on a simple spreadsheet compiled each week. Given the nature of the Iraqi insurgency, successful ISR operations had to include ground-based collection by patrols in close contact with high-value individuals and the populace surrounding them.

Like the airborne collection plan, the ground-based plan began by examining the overall ISR strategy to determine tasks suited to the patrols. Security forces Airmen proved critical to successful implementation of the JISE's intelligence-collection strategy. Each day, patrols operated in the battlespace, conducting terrain-denial operations and interacting regularly with some portion of the roughly 120,000 Iraqi citizens who lived within 10 kilometers of the base perimeter. These patrols presented an enormous intelligence opportunity, especially in mapping the human terrain and relationships among key individuals and groups in the battlespace. According to Gen David H. Petraeus, "the human terrain is the decisive terrain."²⁴ This statement translates to battling insurgents for influence and support from the contested population, whose cooperation, trust, and support we must secure in order for security and stability to take root.

The BSO's campaign plan and JBB's ID operations emphasized attempts to influence the human terrain. In each neighborhood, Army and Air Force patrols struck up conversations with locals to determine the identities of individuals with whom they were speaking, their occupations, and how they felt about topics such as their security situation, government services, and so forth. By identifying occupants of the various houses and obtaining grid coordinates for each dwelling, the patrols literally mapped the human terrain surrounding JBB. JISE analysts dutifully recorded each individual, using the data to build a complete picture of the human terrain. While traditional intelligence sources enabled security forces to narrow down the location of a high-value individual within a block of five to 10 houses, Airmen and Soldiers on the ground easily pinpointed the exact residence and its occupants simply by asking locals to provide information about the individual of interest. This practice proved so effective that it sometimes startled the individual himself when he answered a knock on the door to find a squad of Airmen or a platoon of Soldiers in his front yard.

Counterinsurgency Synchronization: Developing Joint and Combined Partnerships

At JBB, Airmen learned to leverage non-kinetic assets and operations to achieve lasting effects in support of the BSO's COIN and stability campaign plans. The wing hosted biweekly COIN and civil-engagement synchronization meetings to ensure full support to the BSO from the Army, Air Force, and Department of State partners at JBB. Conversely, the BSO embraced Air Force and other partner units as a means of realizing his overall campaign objectives along three decisive lines of operations: security, economic development, and governance. No fewer than five times per week, wing representatives and JISE analysts met

with the BSO and partner units to improve coordination and information sharing. Those meetings included a review of intelligence operations, operations synchronization, targeting, the BSO's weekly effects summary, and numerous synchronization meetings at the field-grade- and company-grade-officer levels. For operators this meant providing support such as ISR data on the locations of high-value individuals, sweeps over IDF hot spots, aerial monitoring of security for Iraqi election polls, and aerial shows of force with F-16s over terrain from which IDF attacks frequently originated.

The BSO was responsible for synchronizing all friendly forces in his area of operations, which included conducting kinetic and nonkinetic actions, maintaining situational awareness of all forces, and controlling fire-support coordination measures. The BSO leveraged the capabilities of all coalition, host-nation, and other partner units, including nonmilitary entities such as the Department of State's provincial reconstruction teams and nongovernmental organizations. Their accomplishments proved that, if properly synchronized, such mutually supporting operations create a symbiotic relationship and unity of effort, ultimately yielding a more efficient use of resources. US Joint Forces Command noted that the BSOs are learning to take advantage of all available operational enablers: "Many joint players . . . operate in the battlespace owners' areas of operation. . . . Battlespace owners are becoming increasingly more comfortable with these 'non-assigned' players in their battlespace."²⁵

It was important to recognize that all operating bases in the BSO's area of operations can have profound positive or negative second- and third-order effects across the operational environment. These include decisions that may appear confined to the base itself, whether they are air provost services (law and order operations), contracting, construction, or something as simple as hosting a local children's event. If such operations and activities are poorly coordinated and if local national ties are not

clearly understood, they can undermine the BSO's relationship with key local Iraqi officials and adversely affect efforts along multiple lines of operation. JBB operated with diverse host-nation forces, including local and federal Iraqi police, paramilitary groups like the Sons of Iraq, locally contracted Iraqi entry-control screeners, and Iraqi Army and Air Force elements. US Air Force security forces conducted combined patrols with Iraqi Army units to build this relationship, which, paired with many US Army and Air Force key-leader engagements with the Iraqi Army, ultimately led to the Iraqi Army's moving forces onto JBB in August 2010.²⁶

Combat operations, both kinetic and non-kinetic, demand coordination across the spectrum of COIN operations. The BSO's campaign plan required Airmen to understand operational COIN doctrine and philosophy as well as how their daily operations and public interactions affected the battlespace. Importantly, leaders of the 332d Air Expeditionary Wing saw partnering with the BSO as an operational imperative, tasking one staff officer to focus exclusively on synchronizing wing operations and host-nation outreach with the BSO. This effort reduced friction, eliminated seams between policies, and fully synchronized JBB with the BSO's information operations and public relations messaging. Some examples of nonkinetic COIN efforts at JBB included special events for local children and businessmen, Airmen on combat patrol conducting key-leader engagements with Iraqi forces or local tribal leaders, Air Force firemen training local volunteer fire departments in American fire department techniques, and security forces and medical personnel providing emergency treatment at base-entry control points. They also included complying with local or host-nation statutes such as water rights and employment opportunities used to reward tribes for cooperating with the coalition, conducting frequent walking patrols to build relationships with local tribes and farmers, rendering emergency medical aid in local villages, delivering school and medical supplies, pro-

viding wheelchairs for the disabled, and conducting a multitude of small but important community-outreach activities to emphasize JBB's "good neighbor" philosophy.

To counter the disadvantages that combat forces faced in terms of limited coverage and loiter time, JBB realized that a comprehensive and continuous synchronization process was essential. This effort produced the air portion of the task force's combined patrol and the ISR synchronization matrix—a snapshot of ground patrols and projected air coverage for every 24-hour period during the weekly BSO effects cycle. The synchronization matrix specifically addressed JBB's IDF threat rings and supplied visibility on both BSO and Air Force ground and air assets. This synchronized effort ensured that ground and air patrols covered the predicted IDF threat windows generated by the JISE.

Organizing for an Integrated Defense

In order to achieve the desired ID effects, the 332d Air Expeditionary Wing organized its base defense assets under the JBB defense force commander, an Air Force security forces colonel responsible for ensuring ID of the base by executing force protection and defensive operations.²⁷ This individual worked to leverage the joint assets operating in the vicinity of JBB to guarantee a collaborative approach with partner joint units and host-nation forces that would produce operational gains and "mitigate potential risks and defeat adversary threats to Air Force operations."²⁸ Furthermore, the defense force commander synchronized his ID operations through the joint defense operations center, collocated with a BSO tactical operations center. The joint defense operations center directed and integrated all subordinate security system and communications elements, serving as a tactical integrator of both intelligence and guidance for BSO effects that drive the base defense effort.

A truly joint team, JBB's joint defense structure included tactical control of the

counter-rocket artillery mortar (C-RAM) joint intercept battery. C-RAM Soldiers and Sailors were responsible for employing the system's intercept, sense, respond, and warn capabilities, together with combat power, as a unique defense against enemy IDF attacks and as a localized warning to populated areas of the base. Placing C-RAM under tactical command of the Air Force defense force commander has ensured the best possible integration of C-RAM capabilities into the overall physical security and force-protection architecture of JBB and the counter-IDF plan.

In order to produce effects in the battlespace, the defense force commander and his Airmen partnered with a ground BSO who had operational responsibility for the terrain surrounding JBB and responsibility for developing and executing a campaign plan supporting national objectives within a specific geographic area. As part of the BSO construct, all personnel transiting through the BSO's domain must comply with his commander's intent for the battlespace, Army tactical command and control protocols, mission-planning requirements, and the scheme of maneuver supporting the BSO's campaign plan. Compliance with all of the guidance and generation of the desired effects demanded a fully synchronized and coordinated effort between the Air Force and Army ground forces that defended the air base.

Significantly, the BSO viewed JBB's base defense as a subset of an extensive list of operational mission tasks within the operational environment. To put the BSO's operational challenges in perspective, he had responsibility for a large geographic area far beyond the IDF threat ring affecting the air base—specifically, more than 3,000 square kilometers rather than only the 243 square kilometers encompassing the JBB standoff-attack threat area. Analysis of the JBB operational environment easily indicates how a BSO can be stretched beyond capacity and how external force protection of an air base could be relegated to a low priority.

Conclusion

The Air Force's official history of air base defense in Vietnam illustrates how the competing priorities of ground commanders made the commitment of Air Force ground combat power to protecting air bases an operational imperative: "Reliance on other services for the defense of air bases was a problem for the [Royal Air Force] on Crete, the *Luftwaffe* in North Africa, and the [United States Air Force] in Vietnam. In each case, air base defense had to compete with other missions on which ground commanders placed higher priority."²⁹

To remedy these historic shortfalls, the joint partners at JBB fully integrated their limited base defense assets to present a unified front to the adversary and limit defensive seams that he might exploit. They did so through multiple levels of information sharing that gave base defenders a common operating picture through shared intelligence. Integrated ground and air operations forces interdicted and captured 22 IDF shooters and triggermen for improvised explosive devices over a five-month period, validating the joint approach to base defense. These operations eliminated more than half of the enemy's upper-tier high-value individuals and more than a dozen of the JBB security belt's "most wanted" enemy personnel.

Air Force leaders should learn many important lessons from the JBB defense model since asymmetric threats to air operations likely will increase in the future. As predicted by a RAND study on air base defense, "We expect that [air base] opponents might pursue three different objectives with these [future] attacks: (1) destroy high-value assets critical to USAF operations, (2) temporarily suppress sortie generation at a critical moment in a crisis or conflict, or (3) create a 'strategic event'—an incident as decisive politically as loss of a major battle is military or operationally—that could reduce U.S. public and/or leadership support for the ongoing military operation."³⁰

The lessons learned in defending JBB have highlighted capabilities and ID

strengths that the US Air Force can contribute to the joint fight to defend against asymmetric threats. The Air Force must continue to refine its ID approach, train leaders who understand and embrace the ground BSO concept, and develop leaders who can readily plug into joint operations in COIN and stability-operation environments. For example, as recently as 2010, the Integrated Defense Command Course, the Air Force's premier base defense leadership course, still does not require coordination with a ground BSO or host-nation partner for its exercise scenarios and remains devoid of any of the technology and synchronization methodologies so essential to the synergy of joint base defense. The Air Force must codify the operational lessons of JBB's ID into organizational and operational constructs that it can apply to current and future base defense operations.

The JBB defense model has proven that Airmen can ensure their place on the battlefield as true joint and combined partners by defending not only their own air assets and war fighters but also those of the joint team. The commitment of Airmen to the joint force protection of JBB has proven critical to keeping IDF at a manageable level and diminishing its effects on air operations. The results were impressive: between November 2008 and March 2010, IDF attacks decreased by 52 percent, and surface-to-air fire decreased by 40 percent.³¹ This success allowed the BSO to concentrate limited combat assets on core tasks that supported activities such as key-leader

engagements, increases in the capacity of Iraqi security forces, economic development, and construction projects. At JBB the BSO stated that Air Force security forces provided the equivalent of more than one infantry company's worth of combat power that he could use to attain specific desired effects outside the wire.³² By sending Airmen out to meet the enemy on the ground and in the air, the Air Force has enjoyed greater security and freedom of movement to support its own air operations and BOS-I base defense responsibilities.

True joint warfare involves caring less about getting credit and more about producing effects. At JBB, Air Force leaders at all levels embraced the ID concept and searched for ways to support the BSO's COIN campaign plan because it paid dividends to the installation's defense, ensuring the conduct of air operations in a more secure and stable environment. As the BSO noted, "Dealing with challenges presented by this complex environment required multiple agile thinkers and holistic problem solvers capable of identifying and implementing operational-environment-specific full-spectrum- or stability-operations-based effects."³³ These battlefield effects speak volumes about what Airmen can achieve with their joint and combined partners when they are effectively integrated and positioned to bring their ID capabilities to bear in support of the joint fight. Base defense experiences in Iraq demand a fresh look at the role the Air Force plays in defending its own assets and those of the joint force. ✪

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The Dangerous Decline in the Department of Defense's Vaccine Program for Infectious Diseases

Col Kenneth E. Hall, USAF*

For over 230 years, vaccines advanced by the US military research and development (R&D) community have dramatically reduced the impact of naturally acquired infections, not only in America's armed forces but also in society at large. In recent years, however, the military's vaccine program for infectious diseases has lost considerable emphasis, funding, and mission capability. In the 1990s, with the burgeoning concern for weaponized bioagents in Iraq and North Korea, Congress turned its attention to combating

biological threats of deliberate rather than natural origin. The Department of Defense (DOD) responded by partitioning its bio-defense and infectious-disease vaccine acquisition programs, with biodefense vaccines holding a higher acquisition priority and receiving more robust funding than infectious-disease vaccines. This choice has significantly eroded the DOD's ability to ensure the acquisition and availability of the right vaccines at the right time to optimally protect US forces from established and emerging natural infections now and in the future.¹

*I wish to thank Col Gilbert Hansen, USAF, my adviser for the Air War College research paper from which I derived this article.



The DOD needs to take swift actions to revitalize its infectious-disease vaccine program and enhance the synergy between biodefense and infectious-disease activities to resolve shortfalls in vaccine acquisition and availability. Specifically, the DOD must collectively assess and prioritize all biological threats, whether natural, accidental, or deliberate in nature; consolidate redundant vaccine acquisition activities; elevate the priority of infectious-disease vaccines; and provide ample resources to sustain a robust vaccine acquisition capability to protect US military forces against validated and prioritized biological threats.²

This article first establishes the historical impact of naturally occurring infectious diseases on military operations, the criticality of force health protection (FHP) in defending the human weapon system, and the superiority of vaccines among medical countermeasures. It then makes a case for why US military leadership in R&D for infectious-disease vaccines must remain a vital FHP imperative for safeguarding the war fighter and optimizing the US military's mission effectiveness. Next, the article analyzes how unbalanced threat assessment and mission focus, disparate organization, disproportionate funding, and dissimilar priority status hinder the DOD's acquisition efforts regarding infectious-disease vaccines; in so doing, it points to the department's loss of adenovirus vaccine as an example of the program's decline. Finally, it recommends ways to enhance FHP vaccine acquisition and availability that will posture the DOD and America's military forces to assure national security in the twenty-first century.

Historical Effect of Infectious Diseases on US Military Readiness and Effectiveness

Throughout America's wars, naturally acquired infectious diseases—many preventable by vaccine—have eclipsed bombs and bullets as the culprits of morbidity,

mortality, disability, and mission degradation. As thousands of his troops fell ill—and hundreds died—from smallpox during the first two years of the American Revolution, resulting in campaign losses, poor morale, and sparse recruiting, Gen George Washington lamented, “Should the disorder infect the Army, in the natural way . . . we should have more to dread from it, than from the sword of the enemy.”³ Via inoculation, the Continental Army dramatically reduced smallpox mortality from 160 to 3.3 per 1,000 cases, all but eliminating the threat.⁴ The US Civil War saw almost twice as many deaths from disease (65 per 1,000) as from battle (33 per 1,000).⁵ Of the 6 million disease cases among 2.8 million enlistees on both sides, over 95,000 died and roughly 250,000 were discharged for disability.⁶ Typhoid fever, malaria, and yellow fever accounted for 80 percent of US military deaths in the Spanish-American War, forcing a rapid withdrawal from Cuba soon after the end of hostilities.⁷ Although World War I saw—for the first time—near parity between US deaths from battle (50,510) and disease (51,477), the latter's impact on combat operations was demoralizing.⁸ Various diseases accounted for 95 percent of American battlefield hospital admissions in World War II, 69 percent in Vietnam, 71 percent in the first Gulf War, and over 95 percent in Somalia.⁹ Unchecked, natural infections can wreak havoc on military forces.¹⁰

Criticality of Force Health Protection in Defending the Human Weapon System

The DOD's FHP doctrine characterizes every service member as a human weapon system requiring total life-cycle support and health maintenance.¹¹ Protecting the human weapon system, the central element of military power, is pivotal. Absent “craniums at the controls,” “boots on the ground,” and “hands on deck,” wars cannot be won. Strained budgets, emerging technologies,

and evolving threats have pressed the United States to transform its military into a lighter, leaner, and more agile force. With fewer people performing more specialized roles, it is critical that each military member remain healthy, fit, and effective. Maintaining this ideal can present a challenge since DOD personnel often find themselves in austere locations, on short notice, and under stressful conditions involving an abundance of naturally acquired infectious threats, naïve immune systems, and limited health-care support. A vital part of FHP, immunization is effective in mitigating these operational hurdles.¹²

Superiority of Immunization among Medical Countermeasures

In defeating health threats, primary prevention—action prior to exposure—reigns supreme. Immunization affords the lowest risk, highest efficacy, and most cost-effective protection to vaccine recipients. Immunization is superior to therapeutics (e.g., antibiotics and chemoprophylactics) and personal protection (e.g., repellents and bed nets) since it does not require knowledge of exposure; is not contingent upon an accurate and timely diagnosis; protects against severe diseases (e.g., rabies) and those for which treatment is unavailable, ineffective, or prone to cause side effects; does not require individual compliance (e.g., antimalarials); and neither contributes to nor is fazed by microbial resistance. Immunization can also notably reduce the medical logistical footprint in-theater since every casualty requires five personnel in the evacuation and treatment support chain.¹³ Furthermore, vaccines not only offer a direct benefit to recipients but also afford herd immunity to those in the communities with whom they live and work.¹⁴ Finally, despite perceived differences between weaponized and natural pathogens, “vaccines are a unifying technology proven to effectively and efficiently defeat both of these threats.”¹⁵

The Case for US Military Leadership in Researching and Developing Infectious-Disease Vaccine

Fielding a licensed vaccine is a long, complex, high-risk endeavor. It requires the synergy of expertise and resources from multiple partners spanning government, industry, academia, nonprofits, and international organizations.¹⁶ Managing the substantial scientific and financial risks demands cooperation. In general, no partner can develop and produce a vaccine countermeasure alone. The DOD, for instance, must rely on industry for scale-up production, just as industry relies on the DOD to bring its many unique R&D capabilities to the cooperative effort.¹⁷ Nevertheless, the DOD should play a leading role in vaccine development for a number of reasons.

First, the DOD can draw on its unique experience. The US military codeveloped more than half of the routine vaccines given to service members today.¹⁸ Beyond protecting its own forces, the military's advances also created solutions to diseases of dire importance to national and international public health. The DOD played a significant role in developing eight of the 15 adult vaccines licensed in the United States since 1962.¹⁹ Currently used worldwide, these include vaccines for influenza, meningococcal disease, hepatitis A, hepatitis B, rubella, adenovirus, typhoid, and Japanese encephalitis.²⁰ In addition, investigators who began their careers at US military R&D centers supervised the development of licensed vaccines for yellow fever, mumps, measles, varicella, and oral polio.²¹ In the high-risk business of vaccine production, experience breeds proficiency and efficiency, curbing the scientific, regulatory, and financial risk that can stifle product development.

Second, the DOD offers unique facilities. Currently, the Walter Reed Army Institute of Research houses one of the nation's three pilot facilities dedicated to the production of a variety of investigational vaccines for use in clinical trials.²² Industry actively seeks

the institute's in-house laboratory capabilities to conduct animal modeling studies.

Third, the DOD features unique intellectual property sharing.²³ Highly sought after by industry, DOD partnerships attract companies by allowing them to retain intellectual property rights for use in lucrative civilian markets.²⁴

Fourth, the DOD has a unique R&D network.²⁵ Because the Food and Drug Administration (FDA) requires pivotal clinical trials of products on people living in areas where infectious diseases are endemic, the DOD's overseas laboratories serve as bases for conducting trials that attract industry partnerships.²⁶ Because of its enduring presence, strong host-nation relationships, and professional development of host-nation scientists, the DOD has successfully executed complex clinical trials with industry and international partners.²⁷

Fifth, and most important, the DOD focuses on the often unique needs of the war fighter. This mission distinguishes its infectious-disease activities from those of other organizations that conduct what may appear to be similar R&D. The global effort to develop antimalarial countermeasures provides one example. Outside the DOD, this effort emphasizes drug therapies to attenuate lethal disease in children and pregnant women in underdeveloped countries. The DOD's program, on the other hand, seeks to prevent the war fighter from ever contracting the debilitating illness in the first place. To that end, DOD research has concentrated on developing prophylactic drugs and, more recently, a malaria vaccine solution. Additionally, any drug or vaccine used to protect US war fighters must be licensed by the FDA. Because many companies are reluctant to take on this costly risk independently, the DOD's R&D community plays a key role in moving products with potential military relevance through early development, FDA licensure, and eventual use by the US military.²⁸

Also compelling is the potential effect of infectious-disease vaccines on the military's increasing role in stability operations, which the DOD recently designated "a core

US military mission that [it] should be prepared to conduct with proficiency equivalent to combat operations."²⁹ Infectious diseases contribute significantly to social unrest and conflict in these scenarios. Infections not only ravage the local civilian populace but also can decimate the strength of their national militaries. The prevalence of human immunodeficiency virus (HIV) infection and acquired immunodeficiency syndrome (AIDS) in Africa serves as a persuasive example. Of 33 million people living with HIV worldwide, two-thirds reside in sub-Saharan Africa.³⁰ Armed forces in this region experience HIV infection rates two to three times those of the civilian population, further eroding local, national, and regional prospects for stability.³¹ The following excerpt from a 2002 report by the Center for Strategic and International Studies well summarizes the significance of this US national security concern:

In Africa, HIV/AIDS is spreading fastest in the Horn of Africa, where the United States already has deep concerns about lawlessness and extremism. In both Ethiopia and Kenya, potentially important regional hubs in the violent and volatile East African subregion, adult HIV-prevalence rates are over 10 percent. Nigeria, an essential guarantor of security and economic growth in the West African region, has more than 3 million citizens living with HIV or AIDS. The adult prevalence rate in South Africa, which plays a similar economic and security role in the southern African region, is 20 percent. . . . If these two regional hegemony cannot send peacekeepers, contribute to growth and stability, or guarantee their own internal stability, U.S. security interests in the continent . . . are severely threatened.³²

This situation demonstrates the powerful potential effect that vaccines for endemic diseases could have on geopolitical stability.³³ An effective HIV vaccine could remarkably strengthen foreign militaries, secure vulnerable families and communities, bolster international public health, and reinforce US national security.³⁴

Natural infections will continue to challenge the US military and its R&D community. With 1,500 known human pathogens continuously lurking about and novel agents like H1N1 (influenza A virus or “swine flu”) constantly emerging, infectious diseases will remain a formidable national security threat indefinitely.³⁵ Worldwide, 14.7 million people die each year from known and preventable contagions.³⁶ Even in industrialized nations, 46 percent of all deaths result from infectious causes.³⁷ Discovery of emerging infections has occurred at the rate of one per year since the late 1980s.³⁸ Pathogens adapt, persist, and emerge—this pattern will continue.³⁹ Keeping pace with the evolving threat calls for a robust US military vaccine program for infectious diseases that draws on the venerable experience, proven track record, and unique attributes that no agency other than the DOD can bring to bear. Such a program can continually improve upon the department's unparalleled protection of America's warriors and, in the process, the nation's citizens and global neighbors.

The Department of Defense's Unbalanced Biological-Threat Assessment and Mission Focus

Since the Cold War's end, the DOD has become fixated on combating biological threats of deliberate rather than natural origin. This section examines its lopsided focus on notional bioweapons even though natural infections continue to plague military operations.

Weaponized Pathogens: A Matter of National Insecurity

Despite its remarkable history, the US military infectious-disease vaccine program has taken a backseat to countering the bioterrorism threat since the mid-1990s. Beginning with its stand-up of the Joint Program Office for Biological Defense in 1993 and formalized requirements for biodefense vac-

cines in 1995, the DOD—with a push from Congress—justifiably turned a focused eye to biodefense.⁴⁰ By 1998 the DOD had established the Joint Vaccine Acquisition Program (JVAP) and significantly increased funding for advanced biodefense vaccine development, while core funding for R&D involving infectious-disease vaccines declined.⁴¹ Because of the anthrax letters (sent after the terrorist attacks of 11 September 2001), fears about the proliferation of state-sponsored weapons of mass destruction by Iraq, and al-Qaeda's interest in bioagents, the nation felt extremely vulnerable to biological attack.⁴² The DOD responded with wholesale investments in biodefense as funding for infectious-disease R&D remained level.⁴³

Reportedly, about a dozen states and multiple nonstate actors either possess or are pursuing biological weapons.⁴⁴ Their potential use clearly poses a level of danger to US forces in the contemporary battlespace, as do established and emerging natural infections. To date, the DOD has yet to incur a single case of weaponized disease, yet reports cite some 3,400 cases of natural-origin and vaccine-preventable infectious diseases in deployed US forces since 1998.⁴⁵ Certainly a potential threat, bioterrorism against US interests nevertheless has been limited to the sending of anthrax-tainted letters to 22 American citizens, five of whom died. Moreover, the letters may have come from a lone American researcher having no association with either state sponsors or nonstate actors.⁴⁶

In contrast, by 2008 the West Nile virus had sickened 28,961 Americans—claiming 1,131 lives—since its arrival on US soil in 1999.⁴⁷ The emergence of severe acute respiratory syndrome in 2003, H5N1 (influenza A virus or “bird flu”) in 2006, and H1N1 in 2009 further underscores the clear and present danger posed by natural infectious diseases. Also, to some experts, the emergence of a novel strain of adenovirus among military recruits in 2007 served to “remind us that we are at least equally likely . . . to soon experience large-scale

morbidity through epidemics of emergent pathogens" as we are to experience a biological weapons attack.⁴⁸ Undoubtedly, the United States must prepare its public and military for the intentional use of biological agents, but vigilance for natural infections warrants at least the same level of emphasis.

Natural Pathogens:

An Operational Reality Check

All the while, natural-origin infectious diseases continued to pose real challenges to US military commanders in terms of lost manpower days, reduced effectiveness, increased medical visits, and frequent medical evacuations.⁴⁹ In one triservice study, of 15,459 Operation Iraqi Freedom and Operation Enduring Freedom deployers surveyed, up to 75 percent reported having at least one bout of diarrhea, 69 percent suffered one or more episodes of acute respiratory illness, and "one-quarter believed that combat unit effectiveness had been negatively affected by these common illnesses."⁵⁰ Twenty-five percent of those surveyed required intravenous fluids, and over 10 percent were hospitalized during their deployments. Furthermore, roughly 13 percent of ground-force personnel missed at least one patrol, and 12 percent of aircrew members were grounded.⁵¹

Table 1 summarizes the incidence of the four leading—and potentially vaccine-preventable—infectious diseases in deployed US forces between 1998 and 2009. Of the 3,371 total cases, leishmaniasis, ma-

laria, and Lyme disease accounted for 96.3 percent of the disease burden. Through 2004, leishmaniasis prompted 4.4 percent of the monthly medical evacuations during Iraqi Freedom.⁵² The occurrence of 126 cases of meningococcal disease reflects the absence of an effective vaccine for subtype B of this potentially lethal pathogen. Each of these operational experiences emphasizes the current threat from naturally acquired pathogens and justifies continued development of vaccine solutions for the mission-crippling diseases they cause.

Signs of a Program in Serious Decline: Loss of Adenovirus Vaccine

While the DOD shifted its emphasis to biodefense, the department lost ground in its portfolio of infectious-disease vaccines. Major vaccine shortfalls resulted from a variety of economic, regulatory, scientific, and legal pressures that the existing DOD vaccine-acquisition apparatus could not mitigate (table 2). Previously licensed vaccines for Lyme disease, cholera, and plague are currently unavailable. Ten investigational new drug (IND) vaccines are no longer produced and have limited availability.

The most instructive example is the DOD's loss of adenovirus vaccine. Because of crowding and various stressors, adenovirus frequently causes acute respiratory disease in unvaccinated military recruits.⁵³ Prior to the initiation of routine immunization in 1971, adenoviral outbreaks in DOD basic-training units were common. Infection rates approached 50 percent, hospitalizations reached 10 percent, and occasionally trainees died.⁵⁴ Outbreaks stressed medical services, eroded training effectiveness, and sometimes stalled the training pipeline altogether.⁵⁵ During 25 years of use, the adenovirus vaccine provided to recruits on day one of training virtually eliminated the disease.⁵⁶ In the mid-1990s, however, negotiations between the DOD and the sole manufacturer of adenovirus vaccine failed to produce a financial agreement

Table 1. Summary of the major, potentially vaccine-preventable infectious diseases incurred by deployed US military forces, 1998–2009

	<i>Leishmaniasis</i>	<i>Malaria</i>	<i>Lyme Disease</i>	<i>Meningococcal Disease</i>
Active	771	990	551	106
Reserve	420	68	445	20
Total	1,191	1,058	996	126

Data from "Defense Medical Surveillance System," Armed Forces Health Surveillance Center, 10 December 2009.

Table 2. Shortfalls of previously licensed and IND-only infectious-disease vaccines

	Vaccine
Previously licensed but unavailable	Adenovirus, types 4 and 7
	Lyme disease
	Cholera
	Plague
IND product no longer produced and of limited availability	Argentine hemorrhagic fever
	Chikungunya virus
	Eastern equine encephalitis
	Q fever
	Rift Valley fever
	Tularemia
	Venezuelan equine encephalitis
	Western equine encephalitis
	Botulinum toxoid
	Tickborne encephalitis

Data from Stanley M. Lemon et al., eds., *Protecting Our Forces: Improving Vaccine Acquisition and Availability in the U.S. Military* (Washington, DC: Institute of Medicine of the National Academies, National Academies Press, 2002), 44–45.

concerning upgrades to the production facility required by the FDA. In 1996 the manufacturer could no longer afford to produce the vaccine. As supplies waned across the DOD, prevaccination program morbidity returned, with unvaccinated trainees 28 times more likely than vaccinated trainees to test positive for the types of adenovirus covered by the vaccine.⁵⁷ All stocks were depleted by 1999, and by the end of 2000, seven basic military training centers had experienced adenoviral epidemics.⁵⁸

Today, the DOD still has no adenovirus vaccine, and the disease continues to sicken trainees, burden medical systems, and disrupt training.⁵⁹ For the 12 months prior to December 2009, over 4,400 military recruits with febrile respiratory illness tested positive for adenovirus.⁶⁰ Not all who became ill were tested; the actual number of cases was higher.⁶¹ One DOD study found the loss of adenovirus vaccine responsible for an estimated 10,650 preventable infections, 4,260

visits to medical clinics, and 852 hospitalizations among the roughly 213,000 active duty and reserve trainees enrolled in basic training each year.⁶² Another study projected \$26.4 million as the related annual medical and training costs for the US Army alone.⁶³

The loss of adenovirus vaccine “sounds a warning for the fragile system supporting other vaccines of military and public health importance.”⁶⁴ To stay in business, vaccine manufacturers need to realize a profit. To do so, they must weigh what it costs to manufacture a product, how much of it they can sell at what price, and what they could make if they used their production capacity on a different product. The economic pressures brought on by evolving regulatory requirements caused this sole-source manufacturer to abandon its production of a limited-market vaccine used mainly by the military. Competing priorities and the lack of a single agent with the authority and budget to preserve the availability of adenovirus vaccine were significant DOD shortcomings.

Disparate Organizations, Disproportionate Funding, and Dissimilar Priority

Despite overlapping missions, the DOD maintains separate organizations for the development, procurement, and product management of infectious-disease and biodefense vaccines. Each has exclusive budgetary authority and product-line responsibility. This section investigates the negative consequences of the DOD's decision to decouple its vaccine programs while granting preferential funding and priority to its biodefense efforts.

Disparate Organizations

“The mission of the Military Infectious Diseases Research Program (MIDRP) is to protect the U.S. military against naturally occurring infectious diseases via the development of [FDA]-approved vaccines” and other protection systems.⁶⁵ The JVAP exists to “develop,

produce and stockpile FDA-licensed vaccine systems to protect the warfighter from biological agents.⁶⁶ These agencies feature disparate command and control relationships (fig. 1). In reality, the number of players and interactions is much more complex, indicative of the fragmented and diffuse organization that encumbers acquisition. Congress directed the split-management scheme to raise the visibility of biodefense and streamline acquisition procedures.⁶⁷ In retrospect, however, separating the acquisition of infectious-disease and biodefense vaccines was ill advised for multiple reasons.

First, separate acquisition precludes a unified approach to the identification and prioritization of vaccine solutions based primarily on operational risk rather than the nature of the threat. Similarly, it impedes a united approach to the acquisition of “dual-use” vaccines, those that could counter both a natural and a weaponized threat to military personnel.⁶⁸ The National Select Agent Registry, utilized for monitoring the possession and use of 48 pathogens and toxins that pose a severe threat to human health, contains 13 bioweapons that are also natural infections for which vaccines have been,

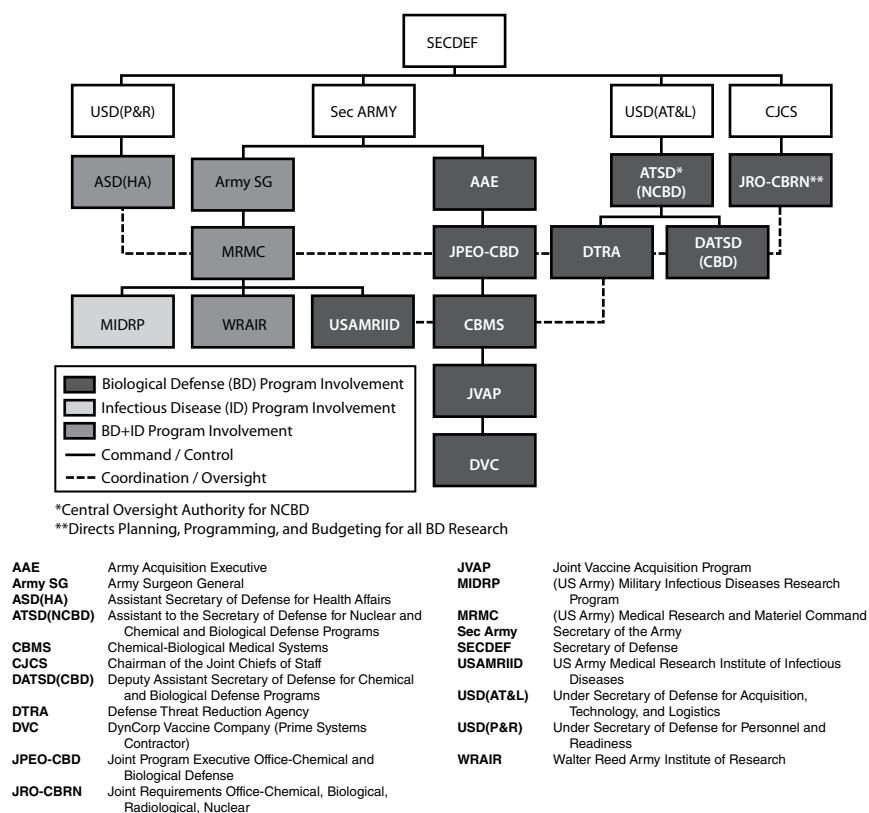


Figure 1. Simplified organizational chart depicting DOD infectious-disease and biodefense vaccine programs. (Adapted from Lt Col Coleen K. Martinez, “Biodefense Research Supporting the DOD: A New Strategic Vision,” Research Report no. 1-58487-288-8 [Carlisle Barracks, PA: US Army War College, 2007], 11; Rudolph Kuppers, US Army Medical Research and Materiel Command [USMRMC] / Military Infectious Diseases Research Program [MIDRP], to the author, e-mail, 11 December 2009; and Col Charles Hoke, MD, US Army Medical Research Institute for Infectious Diseases, retired, to the author, e-mail, 24 January 2010.)

or currently are, in some stage of development by the MIDRP.⁶⁹

Second, separate acquisition fosters programmatic redundancy. Many more similarities than differences exist among the pathogens, science, technology, and business processes for vaccines against natural and weaponized agents. Their development and production follow like pathways, encounter similar difficulties, and present comparable developmental and financial risks.

Third, separate acquisition dilutes limited expertise and splits budgetary power. The complexity of vaccine development demands highly skilled and experienced professionals in all facets, from scientists to administrators. Also, the industry average cost to bring a new vaccine through the development process from concept to licensure ranges from \$800 million to \$1.6 billion over 14 years; to sustain a fielded product costs millions more. Separation curbs professional and budgetary synergy.⁷⁰

Fourth, separate acquisition hinders the Total Life-Cycle Systems Management (TLCSM) of vaccine products—"the implementation, management, and oversight, by [a single accountable authority], of all activities associated with the acquisition, development, production, fielding [and] sustainment . . . of a DOD weapon system across its life cycle."⁷¹ The Joint Program Executive Office for Chemical and Biological Defense leads the TLCSM of biodefense vaccines.⁷² To date, no single locus of TLCSM authority, responsibility, and accountability exists for infectious-disease vaccine products.⁷³ Separation underserves the acquisition of infectious-disease vaccine and precludes collaboration in enterprisewide vaccine TLCSM.

These issues have contributed to significant problems in vaccine availability, such as the loss of the adenovirus vaccine, as previously described. They also signify the level of commitment required by the DOD not only to bring militarily important vaccines on line but also to keep them available.⁷⁴ In its 2002 report to the DOD, the Institute of Medicine was "convinced that the disjointed authority . . . within DOD

contributed significantly to the lack of the additional investment required for continued production of [adenovirus] vaccine."⁷⁵

Disproportionate Funding

Although discrete programs with no single oversight authority are problematic, the pivotal issue in separating the acquisition of infectious-disease and biodefense vaccines is budgetary. In 1993 the DOD's annual budget for the advanced development of biodefense vaccines amounted to \$1 million.⁷⁶ By 1998 funding levels had risen to \$25 million per year.⁷⁷ Between fiscal year (FY) 2001 and FY 2008, the US government allocated \$57 billion to biodefense, the DOD receiving nearly \$12 billion.⁷⁸ In FY 2009, governmentwide allocations jumped by 39 percent over the previous year to \$8.97 billion; the DOD share came to \$1.72 billion.⁷⁹ The Department of Health and Human Services and the DOD received billions to develop, produce, procure, and stockpile vaccine countermeasures against weaponized pathogens.⁸⁰ Since FY 1997, the annual US budget for biological defense has increased over 47-fold, from \$137 million to \$6.5 billion by FY 2008.⁸¹

Several points arise regarding MIDRP funding for its core research since 1994 and projections to FY 2011 (fig. 2). First, management of biodefense vaccine transitioned from the MIDRP to the JVAP in 1998, accounting for the associated funding spike and subsequent dip. Second, there is a relative budget flatline in actual-year dollars over the period. In FY 1994, the MIDRP's annual budget was \$42 million. By FY 2009, it had increased only to \$47 million. Third, when adjusted for inflation to FY 2005 dollars, the buying power of the FY 2009 budget came to only \$41 million, less than that of 15 years earlier. Fourth, the inflationary gap is widening. In FY 2011, the MIDRP's \$46 million annual budget is worth, in effect, roughly \$37 million in FY 2005 dollars.

Inflation has a mounting effect on the MIDRP budget through FY 2015 (fig. 3). Given the projected funding levels, the MIDRP cannot keep pace with inflation. This

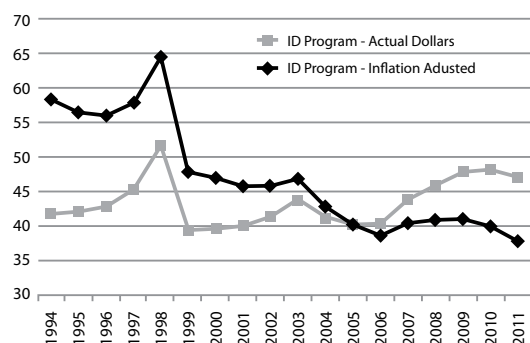


Figure 2. US Army MIDRP funding for core research on infectious diseases (with inflation adjusted to FY 2005, in millions of dollars, exclusive of the HIV program). (Adapted from Rudolph Kuppers, USMRMC/MIDRP, to the author, e-mail, 11 December 2009.)

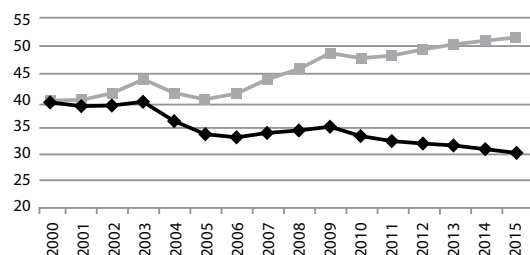


Figure 3. US Army MIDRP budget (FY 2000–15, in millions of dollars, exclusive of the HIV program). (Adapted from Rudolph Kuppers, USMRMC/MIDRP, to the author, e-mail, 11 December 2009.)

dismal scenario is exacerbated by the rising cost of advanced product development and clinical trials, which accounts for roughly 75 percent of total development outlays.⁸² Also, clinical trials on human subjects to assess a vaccine's safety and efficacy are very expen-

sive. In the past five years, these costs have risen from \$15,000 to as much as \$26,000 per enrollee.⁸³ In light of static funding and less buying power, the MIDRP's ability to develop vaccine products is, and will remain, seriously constrained.

Dissimilar Priority

To make the best use of limited resources, the Defense Acquisition Management System has rules that govern the acquisition of military vaccines. Acquisition categories (ACAT I, II, and III) assign priority and determine the level of DOD review, decision authority, and milestones that apply to a given project.⁸⁴ On the one hand, the MIDRP's infectious-disease vaccines are now managed as an ACAT III "less than major" program, the lowest priority level, with each vaccine managed as a separate acquisition project.⁸⁵ On the other hand, the JVAP develops biodefense vaccines as an ACAT II "major system" program under the Joint Program Executive Office for Chemical and Biological Defense.⁸⁶ The ACAT II designation affords biodefense vaccines not only higher priority for acquisition funding but also higher visibility than vaccines against infections of natural origin. The lack of emphasis on these natural infectious-disease countermeasures has contributed to the loss of licensed vaccines (e.g., adenovirus, plague, and cholera) and the inability to advance IND products (e.g., tickborne encephalitis, Rift Valley fever, and eastern equine encephalitis vaccines) to full licensure. Additionally, the inferior priority of infectious-disease vaccines makes their funding vulnerable to becoming offsets for higher ACAT programs.

Recommendations

This section recommends four imperatives for ensuring the DOD's ongoing ability to produce vaccines against natural infections and offers final thoughts on reversing the dangerous decline in the US military's ability

to conduct infectious-disease R&D. The challenges are formidable, but the DOD can cure its ailing infectious-disease vaccine program and regain its former status as the world's premier force health defender.

Redesign the Biological-Threat Assessment Process

The DOD should concurrently consider all biothreats, regardless of origin, and then prioritize them based on a balanced assessment of notional and experiential risks to war fighters, independent of the nature of the threat.⁸⁷ To facilitate this process, it should institute a standardized cost-benefit computation for candidate vaccines and strategies, where solutions to natural or weaponized biothreats with the most compelling calculations garner the highest priority for funding.⁸⁸

Merge the Management of Infectious-Disease and Biodefense Vaccines

The DOD should have a single program to unify needs identification, prioritization, basic and advanced research, production, procurement, and ongoing product management.⁸⁹ We must vest program leadership in a single agent with the authority, responsibility, and accountability for ensuring effective TLCSM of all vaccines that protect war fighters against natural and weaponized pathogens. Combining programs will facilitate the synergistic sharing of ideas, expertise, and resources; incentivize cohesive thinking on vaccine solutions of mutual benefit to infectious-disease prevention, biodefense, and public health; and underpin the maintenance of a robust, adaptable technology base that can flex to conduct timely research on the moving target of natural and weaponized biothreats. In addition, a unified program champion will provide the strongest advocacy for infectious-disease vaccines to balance against the government's proclivity for biodefense countermeasures.

Elevate the Acquisition Priority of Infectious-Disease Vaccines

Like those intended for biodefense, vaccines to counter natural infections deserve management at the ACAT II major-system level (or higher). Doing so would be consistent with the first recommendation, above, to consider all biological threats—regardless of origin—of equal potential harm to war fighters. This priority will ensure appropriate visibility of and emphasis on the acquisition of both infectious-disease and biodefense vaccines within the DOD.

Increase Funding for Research, Development, and Procurement of Infectious-Disease Vaccines

In addition to raising overall program funding, the DOD should fund each infectious-disease vaccine as a separate line item in the Future Years Defense Program to ensure TLCSM.⁹⁰ These are the most important actions the department must take. To be clear, we do not need a zero-sum realignment of resources for biodefense and infectious-disease vaccines. Biodefense vaccines should remain fully funded, with relative parity achieved for the development of infectious-disease vaccine. Currently, at least half of national biodefense funding serves both biodefense and public health ends.⁹¹ This kind of overlap should become the rallying cry of DOD vaccine prioritization and resource allocation. A successful biothreat vaccine program demands cooperation, not competition.

Conclusion

The president's 2009 *National Strategy for Countering Biological Threats* calls for "a comprehensive and integrated approach . . . to prevent the full spectrum of biological threats . . . whether . . . natural, accidental, or deliberate [in nature]."⁹² To meet his intent, the DOD needs to reorganize its current infectious-disease and biodefense vaccine-acquisition stovepipes and establish a

unified program to effectively assess, prioritize, develop, and procure vaccines to protect war fighters against threats from all causes.

Staying ahead of the changing threat requires the DOD to refocus on the full range of biothreats and commit ample resources

to the sustained development of vaccines for infectious diseases as well as biodefense. Anything less places force health, combat readiness, and operational effectiveness at serious risk. ☛

Notes

1. In this article, *acquisition* denotes the DOD's process for ensuring that vaccines are acquired and maintained for the protection of its forces, from needs identification, prioritization, and basic research to advanced development, testing, production, and procurement. *Availability* involves having on hand the right vaccine for the right threat at the right time.

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3. Stanhope Bayne-Jones, *The Evolution of Preventive Medicine in the United States Army, 1607–1939* (Washington, DC: Office of the Surgeon General, Department of the Army, 1968), 52, accessed 28 October 2009, <http://history.amedd.army.mil/books/docs/misc/evprev/default.html>.

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5. Bayne-Jones, *Evolution of Preventive Medicine*, 99.

6. *Ibid.*

7. *Ibid.*, 124.

8. *Ibid.*, 151.

9. Mark S. Riddle et al., “Past Trends and Current Status of Self-Reported Incidence and Impact of Disease and Nonbattle Injury in Military Operations in Southwest Asia and the Middle East,” *American Journal of Public Health* 98, no. 12 (2008): 2199; and Stanley M. Lemon et al., *Protecting Our Forces: Improving Vaccine Acquisition and Availability in the U.S. Military* (Washington, DC: Institute of Medicine of the National Academies, National Academies Press, 2002), 10.

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15. DOD, *Report on Biological Warfare Defense Vaccine Research and Development Programs* (Washington, DC: DOD, July 2001), 7, accessed 21 October 2010, <http://www.defense.gov/pubs/ReportonBiologicalWarfareDefenseVaccineRDPrgras-July2001.pdf>.

16. Rudolph Kuppers, US Army Medical Research and Materiel Command (USMRMC) / Military Infectious Diseases Research Program (MIDRP), to the author, e-mail, 11 December 2009.

17. *Ibid.*

18. *Ibid.*

19. “History and Achievements,” MIDRP, accessed 5 January 2010, <https://midrp.amedd.army.mil/info/HAchieve.html>.

20. *Ibid.*

21. *Ibid.*

22. “CBRN Medical Countermeasures (MCM) Manufacturing Capabilities Analysis of Alternatives Report” (Livingston, NJ: The Quantic Group, 15 June 2009), 10.

23. Intellectual property is "the group of legal rights to things people create or invent. Intellectual property rights typically include patent, copyright, trademark and trade secret rights." "Glossary," *Sitepoint*, accessed 21 October 2010, <http://www.sitepoint.com/glossary.php?q=I>.

24. Kupperts to the author, e-mail; and Lemon et al., *Protecting Our Forces*, 87.

25. Col Charles Hoke, retired, MD, US Army Medical Research Institute for Infectious Diseases, to the author, e-mail, 24 January 2010.

26. A pivotal clinical trial must be controlled, have a double-blinded design when practical and ethical, be randomized, and be of adequate size. See "Appendices—Clinical Trials Insight," *AdisInsight*, 2000, accessed 21 October 2010, <http://www.adisinsight.com/aClientServiceinfo/CTI%20Appendix.pdf>. DOD overseas labs are located in Thailand, Peru, Kenya, Egypt, and Indonesia. Hoke to the author, e-mail.

27. Col Julia Lynch, USMRMC/MIDRP, to the author, e-mail, 18 January 2010.

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29. Department of Defense Instruction (DODI) 3000.05, *Stability Operations*, 16 September 2009, 2, accessed 21 October 2010, <http://www.dtic.mil/whs/directives/corres/pdf/300005p.pdf>.

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31. Mark Schneider and Michael Moodie, *The Destabilizing Impacts of HIV/AIDS* (Washington, DC: Center for Strategic and International Studies, May 2002), 2, accessed 21 October 2010, [http://www.reliefweb.int/rw/lib.nsf/db900SID/LGEL-5DWGVF/\\$FILE/csis-aids-may02.pdf?OpenElement](http://www.reliefweb.int/rw/lib.nsf/db900SID/LGEL-5DWGVF/$FILE/csis-aids-may02.pdf?OpenElement).

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35. Lynch to the author, e-mail; and W. Neal Burnette et al., "Infectious Diseases Investment Decision Evaluation Algorithm: A Quantitative Algorithm for Prioritization of Naturally Occurring Infectious Disease Threats to the U.S. Military," *Military Medicine* 173, no. 2 (February 2008): 174–81.

36. Sara E. Davies, "Securitizing Infectious Disease," *International Affairs* 84, no. 2 (2008): 295–313; and WHO, "The Top Ten Causes of Death," fact sheet, February 2007, accessed 15 January 2010, <http://www.who.int/mediacentre/factsheets/fs310.pdf>. The top five infectious-disease killers include HIV/AIDS, pneumonia, diarrhea, malaria, and tuberculosis; arguably, climate change is significantly changing weather patterns and disrupting ecosystems, leading to the emergence of new niches for infectious-disease pathogens and vectors. Lynch to the author, e-mail.

37. Burnette et al., "Infectious Diseases Investment," 174.

38. Davies, "Securitizing Infectious Disease," 298.

39. Hoke to the author, e-mail.

40. Edward T. Clayson, Joint Vaccine Acquisition Program (JVAP) Product Management Office, JVAP overview presentation slides, 30 May 2003, slide 5.

41. Ibid.; and Kupperts to the author, e-mail (compares 1997 and 1999 MIDRP funding).

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"Adenovirus 14: An Emerging Threat," 17 April 2009, Clinicians' Biosecurity Network, accessed 27 November 2009, http://www.upmc-cbn.org/report_archive/2009/04_April_2009/cbnreport_04172009.html.

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50. Ibid., 714. *Campylobacter*, *Shigella*, *Escherichia coli* and norovirus have been the most commonly reported diarrheal infections in deployed forces. *Rhinovirus*, *Coronavirus*, parainfluenza virus, and adenovirus have been the most commonly reported causes of acute respiratory infections in deployed forces. "Defense Medical Surveillance System."

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53. James Chin, ed., *Control of Communicable Diseases Manual*, 17th ed. (Washington, DC: American Public Health Association, 2000), 428.

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57. Sanders et al., "Impact of Illness and Non-Combat Injury," 663.

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62. Gray et al., "Adult Adenovirus Infections," 668.

63. M. René Howell et al., "Prevention of Adenoviral Acute Respiratory Disease in Army Recruits: Cost-Effectiveness of a Military Vaccination Policy," *American Journal of Preventive Medicine* 14, no. 3 (April 1998): 168.

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69. *Possession, Use, and Transfer of Select Agents and Toxins, Interim Final Rule*, Code of Federal Regulations, title 42, pt. 73, accessed 4 November 2009, <http://www.cdc.gov/od/sap/docs/42cfr73.pdf>; and Lemon et al., *Protecting Our Forces*, 40–41. The National Select Agent Registry "currently requires registration of facilities, including government agencies, universities, research institutions, and commercial entities, that possess, use, or transfer biological agents and toxins." See the registry's Web site, "Overview," accessed 19 July 2010, <http://www.selectagents.gov>.

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86. The DOD estimates that major systems will require an eventual total expenditure for research, development, test, and evaluation of more than 140 million in FY 2000 constant dollars or an eventual total expenditure for procurement of more than 600 million dollars. Department of the Army, *Weapon Systems 2010* (Washington, DC: Department of the Army, Office of the Assistant Secretary of the Army for Acquisition, Logistics, and Technology, 2009); and Office of the Deputy Assistant Secretary of Defense for Chemical and Biological Defense, *Department of Defense Chemical and Biological Defense Program Annual Report to Congress* (Washington, DC: Department of Defense, March 2005), E-38, accessed 14 July 2010, <http://handle.dtic.mil/100.2/ADA435936>.

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Three Cups of Tea: One Man's Mission to Promote Peace . . . One School at a Time

by Greg Mortenson and David Oliver Relin.
 Viking (published by the Penguin Group)
 (<http://us.penguinroup.com/>), 375 Hudson
 Street, New York, New York 10014, 2006, 352
 pages, \$25.95 (hardcover), ISBN 9780670034826;
 2007, 368 pages, \$16.00 (softcover), ISBN
 9780143038252.

As Gen Stanley McChrystal traveled from Kabul, Afghanistan, to Washington, DC, on 23 June 2010, he e-mailed a message to Greg Mortenson: "[I] will move through this and if I'm not involved in the years ahead, will take tremendous comfort in knowing people like you are helping Afghans build a future." The note arrived in Mortenson's in-box at approximately 0100 eastern standard time. Nine hours later in the Oval Office, President Obama accepted General McChrystal's resignation. The president had no disagreements with either McChrystal's policy or his conduct of the war in Afghanistan, declaring that "we are in full agreement about our strategy" (Elisabeth Bumiller, "Unlikely Tutor Giving Military Afghan Advice," *New York Times*, 17 July 2010; and "Obama Relieves McChrystal over Critical Remarks, Names Petraeus as Replacement," *FOXNews.com*, 23 June 2010).

McChrystal's note, a reply to an e-mail of support from Mortenson, reflected a growing bond between the latter and senior military leaders. Increasingly, they had sought his insight into and advice on the tribal cultures of rural, mountainous Pakistan and Afghanistan to help adjust their counterinsurgency theories to the realities on the ground.

In *Three Cups of Tea*, Mortenson relates the story of his unlikely transformation from moun-

taineer to cofounder and executive director of the Central Asia Institute (CAI) and adviser to senior military leaders. That transformation began in 1993 after his failed attempt to climb K2—a peak in northeastern Pakistan and, at 28,267 feet, the world's second highest mountain and the most difficult to climb. During the descent, he became separated from his group, suffered from exposure, and stumbled into the Balti village of Korphe. The family of Haji Ali, the village's chief elder, nursed him back to health. Appreciating what the villagers had done for him and recognizing the value they placed on education, he promised to build a school for their 84 children.

A man of modest means who supported his mountain climbing habit with his income as an emergency room nurse, Mortenson had to find sponsors who could finance the school in Korphe. He met Jean Hoerni, a Silicon Valley pioneer, who donated the \$12,000 Mortenson needed for the project. Construction of the school, which involved working with the village's elders and using local labor, did so much to create beneficial relationships and develop his reputation that elders in nearby villages asked Mortenson to help build schools in their communities as well. Despite Mortenson's desire to help, lack of resources presented a problem. Hoerni, who was dying from leukemia, helped solve it by cofounding the CAI with Mortenson and endowing it with enough money to build additional schools in rural Pakistan and Afghanistan.

Since then, the scale of Mortenson's and the CAI's efforts has increased exponentially. In Pakistan and Afghanistan, the institute has funded and organized the building of over 144 schools by local villagers in coordination with their elders. It underwrites those schools and their approximately 1,200 teachers, who have educated more than 64,000 students (including 52,000 girls). Additionally, the CAI has helped with women's education, public health, and conservation projects. By making a difference in the quality of life in that region, both the institute and Mortenson have earned the respect of the villagers. Consequently, Mortenson and his CAI team were able to set up more than 35 meetings throughout Afghanistan between village elders and General McChrystal and his senior staff.

Three Cups of Tea offers the reader an enjoyable nonfiction adventure story of a respectable hero operating in a culture very different from his own—one located in a beautiful, exciting, and physically challenging part of the world.

Mortenson's story alone, which includes accounts of his dealing with kidnapping, death threats, and fatwas issued by village mullahs, is worth the read. But this book offers so much more—specifically, insight into the culture of the people who inhabit the mountainous areas along the border of Pakistan and Afghanistan. It illuminates their customs, the principles they value and respect, and their visions of a desirable future. The reader is exposed to the lessons that Mortenson learned as he muddled through his first years in the region, driven by a sense of purpose to keep his promise to build a school in Korphe. Indeed, the book's title derives from one of those lessons: "Haji Ali taught me the most important lesson I've learned in my life . . . to share three cups of tea, to slow down and make building relationships as important as building projects" (p. 150). Other lessons included how to dress, wash, worship, eat, and negotiate without being offensive. He learned the importance of and the power associated with the types of people found in most communities—from family members, clerics, and tribal leaders to military commanders and warlords. The larger and more important lessons Mortenson communicates are his thoughts about building relationships and empowering communities, as well as his realization that education and literacy offer the most effective and enduring way for promoting peace and stability—particularly for women.

Three Cups of Tea begins Mortenson's adventures in Pakistan, and his follow-on book *Stones into Schools* (Viking, 2009) continues the story as Mortenson and Sarfraz Khan (one of his most valued associates) expand their school-building efforts into Afghanistan. Mortenson, the CAI staffs in Afghanistan and Pakistan, and CAI fundraisers in Montana are making a significant difference in the region's quality of life and its advance toward long-term peace and stability. Recognizing those accomplishments, General McChrystal, NATO's most senior military commander, took time to write Mortenson an encouraging note on his last day of command. Adm Mike Mullen, chairman of the Joint Chiefs of Staff, attended the opening of one of Mortenson's schools in a remote village in Afghanistan's Hindu Kush mountain system and voiced a similar thought: "What Greg understands better than most—and what he practices more than anyone else I know—is the simple truth that all of us are better off when all of us have the opportunity to learn, especially our children. By helping them learn and grow, he's shaping the very future of a

region and giving hope to an entire generation" ("Stones into Schools," Central Asia Institute, 2009, <http://www.stonesintoschools.com>).

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The Architecture of Leadership by Donald T.

Phillips and Adm James M. Loy, USCG, Retired.
Naval Institute Press (<http://www.usni.org/naivalinstitutepress/index.asp>), 291 Wood Road, Annapolis, Maryland 21402, 2008, 96 pages, \$16.95 (softcover), ISBN 978-1-59114-474-8.

Preparation equals performance. Those three words form the basis of *The Architecture of Leadership* and provide the reader with a primer on how to become a better leader. A quick read, this book uses the basic tenets of architecture to describe how leadership can be built from the ground up, much like building a house. The authors begin with a foundation based on character and values that leaders tend to display. They then move to laying down a floor, highlighting a drive to achieve while tempering that drive with a capacity to care. The framework of their house is built from a series of innate traits exhibited by those who tend to take on the leadership mantle. Filling in this framework is a list of acquired skills necessary in completing the "house." Covering this framework is the ceiling of opportunity—the architecture of the house is of no value unless the leader has the opportunity to tie everything together. Finally, the author's research culminates with the roof of the house, signifying performance, bringing all the components together and succeeding where others may have failed.

Although this sounds like it could be a rather dry read, the authors do an excellent job of weaving throughout the book historical examples of past great leaders who have exemplified a particular trait or ability. All of the chapters include interesting and enjoyable highlights in the form of quotations attributed to those leaders, each of which has relevance to its own chapter and connects to the others. One of my favorites is from Adm Grace Hopper: "You manage things, you lead people." How many people reading this review have felt they were subject to just the opposite kind of leader? The book culminates in a story about the US Coast Guard's response to Hurricane Katrina and the ways that response

demonstrated successful application of the myriad facets comprising leadership found in *The Architecture of Leadership*.

Donald T. Phillips and Adm James M. Loy are both eminently qualified to speak on the topic of leadership. Phillips has published numerous books on leadership, perhaps best known for *Lincoln on Leadership: Executive Strategies for Tough Times* (Warner Books, 1992), a staple of professional military education for years. Admiral Loy has practical experience as a leader, having served more than 45 years in federal service and reaching the pinnacle of his military service as commandant of the Coast Guard. He also served as deputy secretary for the Department of Homeland Security and has spoken extensively about leadership.

Well laid out, the book follows a logical sequence that anyone can relate to: the building of a house. The chapters walk readers rapidly through the book, and it is over before they even realize it. One can almost describe the book as a checklist of those traits that a leader can work on to help create a recipe for success. The examples relate well to the topic at hand and offer the reader a glimpse into past decisions made by other great leaders worthy of emulation. Straightforward and effective in scope and applicability, *The Architecture of Leadership* has great relevance to leaders from all sectors of society, not just the military. Another must-have for any library, it provides a solid foundation for effective leadership that public, private, and nonprofit leaders will benefit from enormously.

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Al Qaeda in Its Own Words edited by Gilles Kepel and Jean-Pierre Milelli. Translated by Pascale Ghazaleh. Belknap Press of Harvard University Press (<http://www.hup.harvard.edu>), 79 Garden Street, Cambridge, Massachusetts 02138, 2008, 384 pages, \$27.95 (hardcover); 2009, 384 pages, \$17.95 (softcover), ISBN 978-0-674-02804-3.

Al Qaeda in Its Own Words is a skillfully written, easily digestible combination of history, analysis, and review of the correspondence of some of the most well-known, influential actors in the al-Qaeda organization. Unlike Sayyid Qutb, these actors are not the “fathers” of radical

Islamic movements, but they remain tactically, operationally, and strategically relevant. Kepel and Milelli present the contributions of scholars and professors from the Institute for Political Studies in Paris, whose expertise ranges over Islamism, contemporary Islam, Arabic, and political movements in Saudi Arabia, and who offer summaries of the lives, noteworthy events, and significant writings of Osama bin Laden, Abdallah Azzam, Ayman al-Zawahiri, and Abu Musab al-Zarqawi.

Milelli emphasizes the importance of this knowledge since their ideology lives on, even after death, and is frequently used by other radical jihadi organizations. In many cases, the world is simplified into one fight against terrorism, and people have failed to truly understand what resonates with and motivates the al-Qaeda organization. The images, media blips, and excerpts from writings serve as a good exhibition, but a more comprehensive understanding of the influential actors and their written works “allows its readers to enter into a way of thinking, to get to the very heart of a specific worldview” (p. 4).

Described as the most well-known al-Qaeda member, Osama bin Laden actually possesses little theoretical depth. Contributor Omar Saghi objectively details events in bin Laden's life and provides the reader a cognitive “map” to follow bin Laden's movements through physical space, his social awareness, and his interactions with other influential actors such as Abdallah Azzam and Ayman al-Zawahiri. Readers are exposed to eight different writings (e.g., the “Declaration of Jihad against the Americans Occupying the Land of the Two Holy Sanctuaries” and “Message to the American People”), some of them excerpts, detailing bin Laden's ideas and positions. More importantly, examining these writings fosters understanding about what the intended audiences of the world are reading and how that may affect their decision to join, or not join, radical organizations.

Abdallah Azzam, probably the least well known actor, is considered the theoretician of contemporary, worldwide jihad. Thomas Hegghammer extensively recounts Azzam's history, showing that although Azzam was not the first person to use jihad as a form of political change, he justified it politically and described his vision for implementation. Azzam advocated conflict against the occupiers but did not urge violence against the “far enemy” in their territories. In many instances, his viewpoints differed from those of other radical ideologues. Hegghammer includes

five excerpts (of over 100 books, articles, and conferences) from Azzam's thoughts.

Considered the main "thinker" of al-Qaeda, Ayman al-Zawahiri forms the link between Azzam's ideology and its current implementation, including the movement towards more martyrdom operations. Stéphane Lacroix guides us through al-Zawahiri's life, revealing the people, places, and events that influenced his ideological position. The book offers four excerpts from al-Zawahiri's writings, including the denunciation of the Muslim Brotherhood (in "Bitter Harvest") and a piece laying the foundation for jihad according to his interpretation ("Knights under the Prophet's Banner").

Al Qaeda in Its Own Words ends with a discussion of Abu Musab al-Zarqawi, included here not because of his inspirational contributions to radical Islamic movements but because of his practice of targeting Shiites as the main route to creating mayhem in Iraq. Jean-Pierre Milelli takes the reader through a brief history of al-Zarqawi but focuses mainly on his interactions with members of al-Qaeda and his position on how to pursue jihad in Iraq. The book's sole excerpt from al-Zarqawi's correspondence ("Letter to Bin Laden and Zawahiri") illuminates his identification of the Shiites (or, as he calls them, the heretics) as the real "near enemy" to fight. After explaining his reasoning and intentions, al-Zarqawi asks for approval from bin Laden even though he makes clear that he will proceed as planned, regardless. This stance highlights the real relationship between al-Qaeda and al-Zarqawi.

The editors have included extensive notes, background information, and points of clarification for each section. Though not essential to understanding the book, this material provides excellent supporting information for the reader not well versed in Islam, Islamic radicalism, the Quran, and other related fields.

Reading this book will not create a better leader, better bomb dropper, or more technically competent Airman, but it does offer a glimpse into the minds, experiences, and thought processes of the enemy. By understanding him better, one can take more appropriate actions (or refrain from certain other actions) to counter that enemy. I recommend *Al Qaeda in Its Own Words* to anyone who really wishes to understand whom we are fighting and the ideology for which they are fighting.

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Off I Went into the Wild Blue Yonder by

John James Knudsen. Pelican Publishing (<http://www.pelicanpub.com>), 1000 Burmaster Street, Gretna, Louisiana 70053-2246, 2007, 304 pages, \$19.96 (hardcover), ISBN 978-1-58980-494-4.

As with many memoirs, *Off I Went* has a number of historical errors. It also contains more editorial faults than it should. The book has nothing to do with air combat. It is full of examples of poor flying-training methods. Nevertheless, readers of *Air and Space Power Journal* might find it worthwhile reading. John Knudsen has an engaging writing style, and his story is entertaining, so one might read it for recreation. Beyond that, the book may also prove useful in expanding the reader's knowledge of the history of the Air Force, notwithstanding its factual defects (which say something about the roots of our culture, for it appears that Knudsen writes what is in his memory). The image he has about the history of World War II is fairly common among veterans, and its divergence from the facts is instructive in itself. He makes no bones about many of his (typical) pilot's prejudices of the day, and that teaches us something about what we used to be and how far we have come. His descriptions of the indiscipline of the wartime, stateside Air Corps in the air and on the ground are appalling to the modern reader, but they have the ring of truth. (The service had become the US Army Air Forces before Knudsen entered, but the term *Air Corps* continued to be used many years afterwards. Technically, an Air Corps existed on paper until shortly after the war.)

John James Knudsen was born in 1922 and lived to 2008—and thus witnessed the Great Depression, World War II, and the entire history of the Air Force. Brought up in Great Falls, Montana, by a father who had emigrated from Denmark and a mother from Ireland, he possessed a largely rural, Catholic value system. Clearly, he was a hardworking, intelligent lad who earned much of his way through Woodbury College in Los Angeles by laboring in the Lockheed plant. He graduated with a bachelor's degree in commercial art shortly after Pearl Harbor and entered the Air Corps in 1943. He never got out of the continental United States during the war, spending most of his time as an instructor pilot although he was trained in the B-17 and B-24 toward the end of the war. He was on track for B-29 training when Hiroshima occurred, and he left the service a few months later. Thereafter,

he spent his life as an editorial cartoonist in California, married in 1947, and helped raise eight children. Though he was never in combat, it is clear enough that his short time in the Army Air Forces was a major influence on his life.

Off I Went vividly depicts the helter-skelter character of the training and equipping of the greatest air force in history. The harsh conditions under which Airmen lived and worked stand in stark contrast to those we have enjoyed since the end of the Korean War. Shaky technology and weak maintenance added to the fear that was a constant companion for all flyers. Knudsen relates a string of horror stories about flying challenges that do much to explain why the accident rate of his day was an order of magnitude higher than it has been since, say, 1960. He makes no secret of his contempt for nonflying officers. The weakness of wartime junior leadership and the general indiscipline among Airmen do much to demonstrate the great exodus of the most experienced flyers after Hiroshima and the need to rebuild the new US Air Force almost from the ground up. That the survivors of the Great Depression were able nevertheless to generate the endurance, courage, and skill to achieve a remarkable victory confirms the greatness of that generation. It also teaches the importance of maintaining a technological, industrial, and professional military base in peacetime against an unpredictable future.

I recommend that *Off I Went* occupy a fairly high place on the aspiring warrior-scholar's reading list for the entertainment, lessons on changing military culture, and warnings it provides. Even its factual errors and prejudices have educational value for the modern reader: memoirs are not history, but perception often can have a greater effect on outcomes than reality itself. It takes a long time for realistic history to develop; even then, it is never complete. Meanwhile, we behave according to our perception of reality rather than reality itself.

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Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change edited by Kurt M. Campbell. Brookings Institution Press (<http://www.brookings.edu/press/>), 1775 Massachusetts Avenue

NW, Washington, DC 20036, 2008, 237 pages, \$29.95 (hardcover), ISBN 978-0-8157-1332-6.

The release of Vice Pres. Al Gore's documentary film *An Inconvenient Truth* sparked renewed interest in the national security implications of global climate change. In 2007 a report by the Center for Naval Analysis concluded that climate change is a serious threat to national security. In June 2008, a national intelligence assessment noted that climate change has the potential to indirectly, yet seriously, affect the national security of the United States. *Climatic Cataclysm*, an anthology edited by Kurt M. Campbell, adds to this chorus of concern. Seven of the 12 contributors to the book hail from the Center for New American Security or the Center for American Progress. Two others served in the Clinton administration.

The analysis of Dr. Campbell and company depends upon the validity of existing climate models. Dr. Jay Gullede, a senior scientist for the Pew Center on Global Climate Change, provides the scientific foundation for three climate-change scenarios: expected, severe, and catastrophic. He uses climate models to project temperature increases and then extracts the relevant environmental effects from a report issued by the Intergovernmental Panel on Climate Change. The other authors then apply their expertise in national security to create plausible geopolitical scenarios. Dr. Gullede carefully points out that these scenarios are not predictions of the future but projections that "[describe] an outcome that is deemed plausible, often subjectively, in the context of current uncertainties" (p. 51). The authors do not associate likelihood with any scenario, yet they describe the first one as *expected*.

In scenario one, by 2040, global average temperature rises 1.3° C above 1990 levels, and global mean sea level rises by 0.75 foot. The authors describe a domino effect whereby water shortages lead to food shortages, which cause conflict over these resources, which results in migrations and new conflict in adjoining regions. The developing world is at the greatest risk, but wealthy nations are not immune. The authors call on the United Nations, European Union, and United States to prepare to respond to the expected humanitarian crises. Furthermore, unrest in the developing world leads to disruptions in oil production that put upward pressure on energy prices. Russia, an exporter of energy and one of the few nations that stands to gain in this

scenario, will likely see increased crop production from warmer temperatures in higher latitudes. Of greatest concern is the authors' belief that this scenario "is . . . to a large extent inevitable" (p. 97).

Scenarios two and three arbitrarily double scenario one's average temperature rise to 2.6° C in 2040 (scenario two) and 5.6° C in 2100 (scenario three). The associated rises in sea level are 1.7 feet and 6.6 feet, respectively. The authors consider this increase plausible because existing models do not include feedback mechanisms, such as the release of greenhouse gases from melting permafrost.

The author of scenario two waxes Malthusian in concluding that reduction of the human population is an inevitable consequence of severe climate change. War and disease cause vulnerable populations to die off. Worse still, a nuclear exchange could decimate the human race. As an alternative, he suggests that states may establish reproductive restrictions to control population growth—a morally repugnant prospect to those who value reproductive freedom, but attitudes may be different in 2040.

Scenario three paints an even worse picture. Large democracies such as India collapse. China's gains over the last century are completely reversed. Los Angeles, New York, Houston, and other US coastal cities become uninhabitable after 2040. The developed world, entirely preoccupied with its own survival, becomes isolationist. Genocide reigns unchecked in Africa. Still, scarcity eventually returns the earth into balance but at an extremely high price.

Although the authors' analysis focuses on the effects rather than the causes of climate change, the solutions they offer focus entirely on prevention. R. James Woolsey, former director of the CIA, proposes the most interesting solutions from a military perspective. During a fictional dialogue between John Muir, founder of the national parks system and first president of the Sierra Club, and Gen George S. Patton, the two agree on nine policy options that have the dual effect of reducing CO₂ emissions as well as vulnerability to malignant threats. Providing tax incentives for plug-in hybrid electric vehicles, for example, serves to reduce both greenhouse-gas emissions and dependence on foreign oil. Promoting micropower generation by means of wind turbines and solar panels decreases emissions and diversifies power production, making energy infrastructure more resilient to attack.

The fictional Patton and Muir disagree about the production of coal-to-liquids (CTL) fuel, Muir disliking it because it emits CO₂, but Patton liking it because it undermines oil. The United States has an abundance of coal, and CTL fuel is one of the few alternatives to petroleum that can power aircraft. As the leading US government consumer of oil, the Air Force has expressed interest in procuring half of its fuel from synthetic sources by 2016. Although the proposal is not economical when oil trades below \$60 a barrel, there is strategic value in having alternatives to foreign oil.

The strength of *Climatic Cataclysm* lies in the authors' sound geopolitical analysis of the impact of potential climate change. However, they offer little in terms of analyzing the cause. Although climate scientists deem the scenarios plausible, they suggest no way of evaluating their likelihood, which makes weighing the merits of policies such as the Air Force's CTL plan difficult. Do the possible long-term consequences of global climate change outweigh the clear near-term benefits of reducing dependence on foreign oil? *Climatic Cataclysm* has no answer. However, the authors do provide an imaginative and worthwhile examination of what could become the greatest threat to our nation's security.

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The Candy Bombers: The Untold Story of the Berlin Airlift and America's Finest Hour by Andrei Cherny. G. P. Putnam's Sons (<http://us.penguingroup.com/static/pages/publishers/adult/putnam.html>), 375 Hudson Street, New York, New York 10014, 2008, 640 pages, \$29.95 (hardcover), ISBN 978-0-399-15496-6; 2009, 640 pages, \$18.00 (softcover), ISBN 9780425227718.

An excellent history, Andrei Cherny's *The Candy Bombers* addresses the role of airpower in defeating an enemy's ideas. The book describes global issues associated with the conflict between the United States and the Soviet Union, with Berlin stuck in the middle; military preparedness; decision making and politics; and the lives of key players in the airlift as well as their influence on the outcome. Portraying how "smart power" can lead to victory over a competing set of ideas, Cherny recounts the new US Air Force's

and its leaders' first victory of the Cold War. Such advocates of smart power as Joseph S. Nye and Richard Armitage would likely approve of this book because of the author's ability to demonstrate an effective combination of hard and soft power (i.e., smart power).

A former White House speechwriter and editor of the quarterly journal *Democracy*, the author clearly believes that the United States can use generosity and moral superiority to defeat threats to its security. Alluding in the introduction to the atrocities committed during the terrorist attacks of 11 September 2001 and Soviet brutality during the initial push into Berlin following the fall of the Nazi regime, he establishes parallels in terms of foreseeing possible victory in the "long war." By emphasizing freedom and democracy as the strongest weapons brought to the fight by the United States, Cherny advocates the use of smart power.

The Candy Bombers captures the political intrigue surrounding a presidential election during a time of international crisis. The campaigns of Pres. Harry Truman, Gov. Thomas Dewey, and Vice Pres. Henry Wallace in the presidential election of 1948 illustrate how politicization of international affairs and domestic use of the threat of war can sway voter support. The account of decision making during the election campaign offers excellent insight into civil-military relations and US history.

Readers learn how direct action of the commander on the ground overcomes Washington's lack of political unity regarding Soviet expansion into Berlin. Both Gen Lucius Clay, military governor of Germany, and Col Frank Howley, commander of the military government in divided Berlin, arrived with animosity for the Germans but quickly realized how loyalty to the population and the city of West Berlin confirmed Western resolve against Soviet expansionism. To the point of nearly sacrificing his career, Clay repeatedly stands up to Washington decision makers to prevent the United States from abandoning Berlin and thus avoid armed conflict with the Soviet Union.

Cherny notes Washington's desire to return to its smaller, pre-World War II military posture as well as the rapid demobilization of the military following the war, captured through comparisons of Soviet and Western ground forces and the inability to field significant numbers of airlift aircraft. Clearly the US Air Force saw its air mobility role undermined at this point. As an assistant secretary of the Air Force declared to Washing-

ton decision makers, the "Air Force was firmly convinced that the air operation is doomed to failure" (p. 290).

The author also addresses challenges to operational leadership, reflected in his depiction of General Clay as the middleman between Washington and Moscow and the organizational efforts of Maj Gen William Tunner. Readers discover Clay's desire to be a combat commander during the hot conflict in Europe, his development as a trusted leader who rises to the challenge of irregular war, and his incredible success during the airlift. The description of Clay's return to the United States demonstrates the author's belief that the general personified all of the heroes of the airlift.

Another hero, General Tunner had an amazing ability to convert a "temporary measure to furnish some extra food and supplies" (p. 263) into a precise, efficient, record-setting, long-term effort. Tunner's work also captures the frequent disconnect between functioning as a leader who deals with technological and organizational issues while simultaneously seeing to his Airmen's morale and well-being.

The title of the book calls to mind the nickname of Col Gail Halvorsen, who, during Operation Little Vittles, dropped candy to Berlin's isolated children, thus establishing perhaps the most well known image of the airlift. Indeed, his efforts became a symbol of one man's efforts to change the world. If none of the geopolitical or national political issues presented in *The Candy Bombers* appeal to a student of airpower history, then the Halvorsen story alone makes it a worthwhile read. However, in the process of relating how air mobility and the new US Air Force contributed to the first face-off of the Cold War, Cherny succeeds in demonstrating the importance of using smart power to address our current national challenges.

Lt Col Tom Cooper, USAF

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Circling the Earth: United States Plans for a Postwar Overseas Military Base System, 1942-1948 by Elliott V. Converse III. Air University Press (<http://aupress.maxwell.af.mil>), 155 N. Twining Street, Maxwell AFB, Alabama 36112-6026, 2005, 265 pages, \$22.00 (soft-cover), ISBN 1-58566-141-4. Available free

from <http://www.au.af.mil/au/aul/aupress/Books/Converse/converse.pdf>.

Circling the Earth is a comprehensive narrative and analysis of the post-World War II base-planning efforts that began in 1942. Although this topic may sound dry and uninteresting, Elliott Converse has written an excellent study for people who follow defense bureaucracies and analyze how they operate as they attempt to balance the competing priorities, conflicting objectives, demands, and personal peccadilloes of those they serve. Most planners working in the Pentagon recognize themselves in the author's description of attempts to match broad policy and grand strategy to well-designed plans.

The study provides an interesting mirror to recent base-planning efforts. Like most weapon systems, bases require extensive resources prior to their introduction, as well as during construction and operations. As in the post-Cold War era, planners in the 1940s assumed that the defense budget would see dramatic cuts after the end of World War II. The lessons presented here are helpful to any student of the military establishment who attempts to reconcile strategy with limited resources.

Converse's extensive use of primary sources makes this analysis exceptionally plausible and authentic. Most of them come from the archives of the Joint Chiefs of Staff (JCS) and the personal papers, memoranda, and memoirs of individuals who took part in or oversaw the planning effort.

The development and formulation of US base planning were part of a larger effort to define the role of the United States and its military in a postwar era. The author traces the evolution of policy from a regional to a global security outlook as it became clear that observed threats would not come from several different, historically hostile countries, but from a more monolithic and powerful Soviet Union. This fact changed the perceived role of US military forces from part of an international police force, responsible for keeping the peace in internationally designated zones, to a force that would have to remain strong to defend the United States as well as parts of Europe and Asia. The role of the military base shifted from a means of promoting peace and commerce to an outpost for conducting aerial attacks against an aggressive Soviet Union. Additionally, the geographic focus shifted from Asia to Europe and the Middle East, due to security issues and economic interests. The

technological limitations of Air Force bombers led to the need for bases despite previous analysis to the contrary. This debate was heavily influenced by the increasingly aggressive insistence by the Army Air Forces (AAF), precursor of the US Air Force, that airpower would prove decisive in future conflicts.

All of the major military bureaucracies, including the Army, Navy, Department of War, AAF, Department of State, and Civil Aeronautics Board, were involved in strategy formulation and the conflict over resources. Converse describes in some detail the interplay among the JCS, AAF, and Navy, and how interservice rivalry over future roles and budgets affected strategy development and base locations.

Of special interest is the description of civil-military relations and their evolution from the beginning of the war to the reorganization of the US security establishment in 1947. The direct access to Pres. Franklin D. Roosevelt enjoyed by the JCS created many problems for the civilian secretaries of war and the Navy, as they attempted to put their own imprints on policy. After Roosevelt's death, the author describes how the civilian secretaries began to interpose themselves, together with the various organizational and bureaucratic mechanisms they established, into the base-planning process. The transition from the elevated status the military occupied during the war to the relegation expected at war's end acted as a substantive driver for much of the sparring that occurred during the planning process.

Circling the Earth has some shortcomings. For example, it includes extensive discussion about the economic and commercial aspects of basing that were an important factor in base requirements and location. President Roosevelt pushed the base-planning effort early and hard, convinced that civil aviation would become an important driver of postwar economic success, and that the United States would compete with its allies to secure commercial routes and refueling points. However, the book gives no indication that other commercial aspects may have played a role in base planning, especially for the Navy. Furthermore, it fails to address the potential of merchant shipping as an economic motivator, leaving the reader to wonder whether this omission stems from the lack of discussion about the importance of port access and seaborne trade routes, or whether the subject remains an unexplored part of the historical record that the author chose not to pursue.

Readers would definitely benefit from the inclusion of organization charts describing the structure of the Department of War, Department of the Navy, and JCS, as well as their connections to the executive branch. In addition, maps featuring the proposed base locations and demarcation lines, as described in the text, would have been helpful in visualizing changes that took place from 1942 to 1948.

Moreover, most planners like to see how their superiors receive their efforts and how well their plan worked. *Circling the Earth* describes only the planning efforts—not the execution of strategy or actual placement of bases. Although the author may have used this approach to limit the scope of his topic, a short summary of the plans' execution could have provided perspective on whether the United States actually implemented what the JCS and services had developed, and would have offered valuable lessons to modern-day planners. Finally, readers find little detail on actual negotiations by the State Department that took place to secure bases or base rights or on how that department addressed the unwillingness of other countries to host US bases.

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The Adaptive Optics Revolution: A History

by Robert W. Duffner. University of New Mexico Press (<http://www.unmpress.com>), 1312 Basehart Road SE, Albuquerque, New Mexico 87106-4363, 2009, 485 pages, \$44.00 (hardcover), ISBN 978-0-8263-4691-9.

In May 1991 Dr. Robert Fugate, an Air Force scientist from Kirtland AFB, New Mexico, astounded a standing-room-only audience at the 178th meeting of the American Astronomical Society in Seattle. He disclosed eagerly anticipated details about an innovation that would bring an exponential improvement in the quality of images from space. Showing “before and after” photos as proof, he described how specialized laser beams integrated with waveform sensors, high-speed processors, and deformable mirrors could compensate for the atmospheric turbulence that had heretofore blurred the vision of the world's most powerful terrestrial telescopes. Since that revelation, all new large telescopes

have incorporated this adaptive-optics technology, and many older ones have been retrofitted.

Dr. Robert Duffner, longtime historian for the Air Force Research Laboratory directorates and predecessor organizations at Kirtland AFB, thoroughly explains the development of adaptive optics in this informative book. Because military uses for adaptive optics include tracking, identifying, and (theoretically) disabling satellites in orbit as well as focusing directed-energy weapons to destroy missiles and other targets, development of this technology was shrouded in secrecy from its birth in the 1970s until the end of the Cold War. As the author makes clear, the military potential of adaptive optics encouraged the Air Force, the Defense Advanced Research Projects Agency, and later the Strategic Defense Initiative Organization (now the Missile Defense Agency) to keep investing the money and time required. Bringing the story almost up to date, the book describes the Air Force's continued work with adaptive optics, including its sophisticated telescopes in New Mexico and Hawaii, as well as the YAL-1A Airborne Laser.

The author bases his study on exhaustive research, enhancing its credibility by providing source citations for almost every paragraph. These include interviews with more than 70 people—not only scientists and engineers but also managers, commanders, and high-level decision makers (including several former Air Force secretaries, chiefs of staff, and other Department of Defense executives). In describing the technical challenges that had to be overcome, Duffner gives full credit to various military organizations, MIT's Lincoln Laboratory, and many private companies; quite appropriately, he also emphasizes “in-house” teams of Air Force civilian and military personnel responsible for some of the most impressive breakthroughs.

To help readers unfamiliar with lasers, optics, or the history of defense research, the author provides plenty of background information and other details. At the risk of being repetitious, many chapters summarize material covered previously. Some of the topics can seem a bit too technical for the average reader, but almost 100 well-placed illustrations and photographs aid in understanding the text. Unfortunately, the publisher did not use a color version of any of the images of adaptive optics in action for the book's dust jacket; doing so would have better indicated its contents than the old black-and-white snapshot selected.

The Adaptive Optics Revolution is a prime example of technology transfer—that is, how military research and development (R&D) programs can spin off beneficial civilian applications. This well-written history should be of special value to all R&D professionals and anyone interested in modern astronomy.

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The Art of Command: Military Leadership from George Washington to Colin Powell

edited by Harry S. Laver and Jeffrey J. Matthews. University of Kentucky Press (<http://www.kentuckypress.com>), 663 South Limestone Street, Lexington, Kentucky 40508-4008, 2008, 304 pages, \$32.50 (hardcover), ISBN 978-0-8131-2513-8.

The Art of Command is a collection of nine essays, each written by a different author on various facets of military leadership. The presentation of the essays preserves the sweep of American military history from the outset of the Revolutionary War in 1775 through the Gulf Wars of the 1990s to the retirement of Gen Colin Powell, chairman of the Joint Chiefs of Staff, from active duty on 30 September 1993.

The editors identify nine leadership “themes” and nine military officers who exemplify those themes, stating explicitly at the outset that “each leader personified many, if not all nine, of our key themes” (p. 3). We add that the essayists identify many more than nine.

It is not difficult to recommend *The Art of Command* to a broad spectrum of readers. For those who have neither the time nor the inclination to read book-length biographies, this collection provides brief accounts (20–30 pages) of the lives and contributions of the selected American military men. More importantly, “Integrity and Leadership,” the opening essay on General Washington, elaborates one of the prominent themes in current research on leadership: namely, the influence of the leader’s character upon the success of any enterprise. Caroline Cox brilliantly clarifies the relationship of character to actions in the life of Washington.

We have other reasons for recommending the book. First, the essays’ order of presentation from Washington to Powell offers a useful overview of US military history. Second, veterans

may find an opportunity to relive a portion of their own history. Third, some readers may become acquainted for the first time with some lesser-known figures. Fourth, students of leadership may rediscover the power of transactional and transformative leadership in military guise. The text provides insights into the enormous contributions made by nine genuine American heroes.

Despite the generally positive tenor of this review thus far, we find *The Art of Command* flawed in several respects. First, separately and collectively, the essays contribute little new to our knowledge of leadership, in either its theoretical or applied sense. For example, to point out repeatedly that leading from the front, showing determination and flexibility, and having consideration for subordinates seems hardly original. Second, with the exception of H. R. McMaster, who draws upon the classic work of Carl von Clausewitz, the essayists appear to systematically ignore the extant literature on military leadership, as well as the larger body of leadership research in business and management.

Imprecision in language also flaws the text. For example, the contributors use terms like *styles*, *traits*, *themes*, and *qualities* interchangeably and, in our view, inappropriately. This pattern carries over to essay titles that make no differentiation between characteristics of leadership (integrity, determination, vision, and adaptiveness) and the context of leadership (institutional, cross-cultural [more precisely, coalitional], and technological). All were simply “themes.”

We must also point out biases in the text. For example, of the nine individuals profiled, seven—including Henry H. “Hap” Arnold—were career Army officers. Lewis B. “Chesty” Puller served in the Marine Corps, and Hyman G. Rickover was a Navy admiral. All nine were flag officers, and all but one (Powell) were white males. The hidden messages are clear, if unintended, despite the fact that the nine selected undeniably deserve respect and honor. Finally, we note that the editors only minimally achieve their purpose, as articulated in the “Introduction,” of “provid[ing] . . . a historically grounded exploration of leadership *development*” (emphasis added, p. 2). Although all the essayists refer to their subject’s efforts regarding professional development, they clearly consider that topic of only minor importance.

Despite its shortcomings, we recommend *The Art of Command* to the military and general

readership. We do so in large part because in our current age of historical revisionism and political correctness, it is refreshing to find a book that unabashedly profiles and celebrates genuine American military heroes.

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Melbourne, Florida

Hell Hawks!: The Untold Story of the American Fliers Who Savaged Hitler's Wehrmacht
by Robert F. Dorr and Thomas D. Jones. Zenith Press (<http://www.zenithpress.com>), 729 Prospect Avenue, P.O. Box 1, Osceola, Wisconsin 54020, 2008, 352 pages, \$24.95 (hardcover), ISBN 0-7603-2918-4; 2010, 336 pages, \$17.99 (softcover), ISBN 9780760338254.

Perhaps the most fundamental airpower issue is the relationship between air forces and surface forces. At one extreme one finds the doctrine of Giulio Douhet, as expounded in his seminal work *The Command of the Air*. According to Douhet, airpower is best employed as an independent arm, directly attacking the enemy homeland and achieving victory by bombarding it into submission. The United States applied Douhet's theory in its purest form during the mid-to-late 1950s, when its military strategy emphasized Strategic Air Command. At the other extreme, airpower functions as an enabler and force multiplier, but the ground force is the decisive arm—an apt description of the use of airpower in Operations Enduring Freedom and Iraqi Freedom.

In the middle of this spectrum lies a balanced approach, whereby air and land forces are equal partners in a combined-arms team. One finds an example of this middle way in the successful drive of the 12th Army Group and Ninth Air Force across northwestern Europe from Normandy to Germany in World War II. In *Hell Hawks!* aviation writers Robert F. Dorr and Thomas D. Jones tell the story of the 365th Fighter Group, nicknamed the "Hell Hawks," which operated P-47D Thunderbolt fighter-bombers as part of Ninth Air Force. The authors use as their primary source

extensive interviews that they conducted with aging veterans of the 365th.

After two initial chapters describe the action the Hell Hawks saw over Normandy during the first few days of the June 1944 invasion, the narrative returns to the activation of the unit in 1943 in Richmond, Virginia; its training in Dover, Delaware; and its deployment to England in December of that year. In succeeding chapters, the Hell Hawks have their combat debut, move to a forward airfield in Normandy, and then fight across Europe. By September 1945, the group had turned in its war-weary aircraft for scrapping and returned to the United States for deactivation.

Drawing on their interviews, the authors paint a vivid picture of the 365th Fighter Group at war. As one would expect, the book includes plenty of stories of air combat, as the Hell Hawks' powerful and rugged Thunderbolts inflict heavy losses on enemies in the air and on the ground. Of course the protagonists also suffered losses—and not only in the air. Based close to the front, the Hell Hawks faced some of the same threats and discomforts as their comrades in the ground forces. Pilots detailed as forward air controllers came within small-arms range of the Germans. Death could come by way of a German air raid or a motor-vehicle accident on an icy road. The authors describe how the enlisted members of the unit maintained the aircraft, always outdoors, in primitive conditions and in all weather. Dorr and Jones also stress the equal importance of logistics, which involved moving into a base, operating from it, and then in a few weeks moving to another base, as the Hell Hawks supported the offensive on the ground and then relocated to keep up with it.

No book can be everything to all readers, so it is worth mentioning what *Hell Hawks!* is not. It is not a book about the P-47 Thunderbolt, nor is it an analysis of how airpower contributed to the campaign in which the 365th Fighter Group participated. It is essentially a view of war from the perspective of the enlisted men and junior officers whom the authors interviewed.

Hell Hawks! is a fine contribution to the collection of World War II unit histories. Students and practitioners of airpower will enjoy this tale of how our predecessors fought in the greatest of all wars, nearly seven decades ago.

Kenneth P. Katz
Longmeadow, Massachusetts

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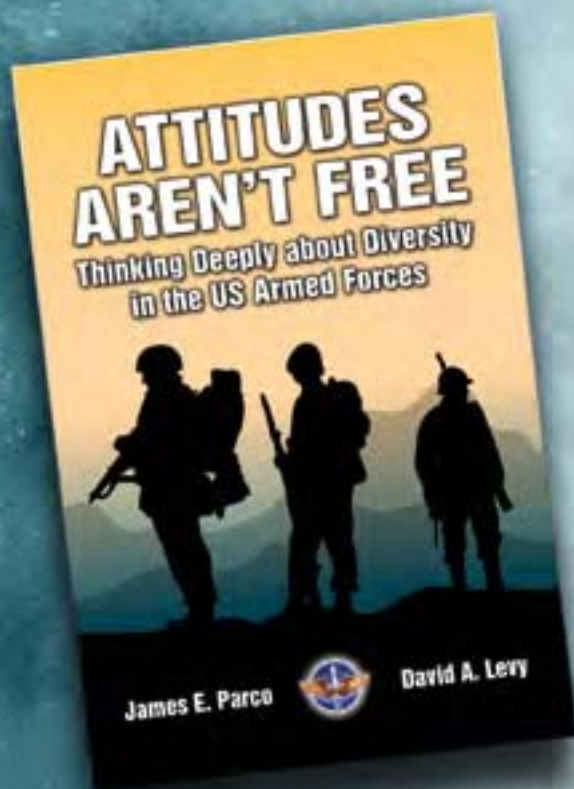
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